Beazer

BEAZER EAST, INC. C/O THREE RIVERS MANAGEMENT, INC.
MANOR OAK ONE, SUITE 200, 1910 COCHRAN ROAD, PITTSBURGH, PA 15220

October 17, 2012

Ms. Carolyn Bury
U.S. Environmental Protection Agency, Region V
77 West Jackson Boulevard
Mail Code DE-9J
Chicago, IL 60604-3590

Re: Former Koppers Wood-Treating Site – Carbondale, Illinois
August 2012 Dioxin Sampling Final/Validated Data Submittal

Dear Ms. Bury:

In accordance with the January 24, 2011 *Final Draft Work Plan for Additional PCDD/PCDF Sampling*, which was conditionally approved by the USEPA on June 1, 2012 and subsequently expanded,[1] Beazer conducted sampling at and near the Former Koppers Wood-Treating Site in Carbondale, Illinois on August 8 and 9, 2012. The purpose of this letter is to transmit the final/validated laboratory analytical data associated with the August 2012 sampling to the USEPA. The following are attached to this letter:

- Attachment 1 – Validated Analytical Data Summary Table
- Attachment 2 – Sample Location Maps
- Attachment 3 – Data Validation Reports (includes validated laboratory analytical data sheets)

Please feel contact me at 412-208-8867 if you have any questions or comments regarding this submittal.

Sincerely,

Michael Slenska, P.E.
Environmental Manager

Enclosure

cc: James Moore, IEPA
Jeffrey Holden, ARCADIS
Paul Anderson, ARCADIS
David Bessingpas, ARCADIS

[1] Revised/alternate locations for residential sample locations were discussed with USEPA during a June 19, 2012 conference call, were documented in an e-mail from Jeffrey Holden (ARCADIS) to USEPA, and were approved in an e-mail from Carolyn Bury (USEPA) dated June 22, 2012.

Writer's Direct Dial: 412/208-8867

Attachment 1

Validated Analytical Data
Summary Table

TABLE 1
VALIDATED ANALYTICAL DATA SUMMARY - AUGUST 2012 SAMPLES

FORMER KOPPERS WOOD-TREATING SITE
CARBONDALE, ILLINOIS

Sample ID:		A1-50	A1-51	A1-52	A1-53	A1-54	A1-55	A1-56	A1-57	A1-58	A1-59	A1-60
Depth (ft bgs):		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date:	Units	08/09/12	08/09/12	08/08/12	08/08/12	08/08/12	08/08/12	08/08/12	08/08/12	08/09/12	08/08/12	08/08/12
PCDDs/PCDFs												
1,2,3,4,6,7,8-HpCDD	ug/kg	0.626 [0.781]	0.918	0.309 [0.325]	1.59	0.545	1.47	0.541	0.488	0.602	2.85 EJ	0.00423
1,2,3,4,6,7,8-HpCDF	ug/kg	0.0588 [0.0491]	0.136	0.062 [0.0721]	0.194	0.0639	0.165	0.0613	0.0465	0.0839	0.452	0.000297 J
1,2,3,4,7,8,9-HpCDF	ug/kg	0.00482 [0.00424]	0.0107	0.00397 [0.00563]	0.00883	0.00425	0.0122	0.00543	0.0042	0.00415	0.0279	0.000115 U
1,2,3,4,7,8-HxCDD	ug/kg	0.00408 [0.00513]	0.0114	0.00357 [0.00364]	0.0264	0.00367	0.0159	0.00563	0.00554	0.00568	0.0241	0.000129 U
1,2,3,4,7,8-HxCDF	ug/kg	0.00377 [0.00334]	0.00889	0.00585 [0.0121]	0.00597	0.00415	0.00635	0.00409	0.00334	0.00429	0.016	0.0000584 U
1,2,3,6,7,8-HxCDD	ug/kg	0.0158 [0.0145]	0.0311	0.0101 [0.0121]	0.0579	0.0129	0.05	0.0133	0.0128	0.014	0.0834	0.000153 U
1,2,3,6,7,8-HxCDF	ug/kg	0.00225 J [0.00161 J]	0.00775	0.00339 [0.00681]	0.0067	0.00289	0.0043	0.00148 J	0.00121 J	0.00291	0.00951	0.0000556 U
1,2,3,7,8,9-HxCDD	ug/kg	0.0117 [0.0118]	0.0257	0.00761 [0.00847]	0.0664	0.00893	0.0315	0.0104	0.01	0.0113	0.0536	0.00024 J
1,2,3,7,8,9-HxCDF	ug/kg	0.000545 J [0.000345 J]	0.000793 J	0.000312 J [0.000913 J]	0.000585 J	0.000614 J	0.000928 J	0.000296 J	0.00019 UX	0.000638 J	0.00152 J	0.0000858 U
1,2,3,7,8-PeCDD	ug/kg	0.00251 [0.0019 J]	0.00597	0.00235 J [0.00295]	0.0157	0.00197 J	0.00859	0.00244 J	0.00247 J	0.00261	0.0096	0.000188 J
1,2,3,7,8-PeCDF	ug/kg	0.000752 J [0.000465 J]	0.0016 J	0.00214 J [0.00811 J]	0.000782 J	0.00102 J	0.00121 J	0.00037 UX	0.000326 J	0.000889 J	0.00164 J	0.0000424 U
2,3,4,6,7,8-HxCDF	ug/kg	0.00394 [0.00325]	0.0135	0.00417 [0.00582]	0.00926	0.004	0.00721	0.00235 J	0.00202 J	0.00522	0.0164	0.0000644 U
2,3,4,7,8-PeCDF	ug/kg	0.00138 J [0.00138 J]	0.00357	0.00229 J [0.00456]	0.00149 J	0.00144 J	0.00243 J	0.00107 J	0.000711 J	0.00366	0.00291	0.0000449 U
2,3,7,8-TCDD	ug/kg	0.000558 [0.000416 J]	0.00162	0.000491 J [0.000675]	0.00118	0.000654	0.0013	0.000699	0.000636	0.000587	0.000761	0.000291 J
2,3,7,8-TCDF	ug/kg	0.000633 [0.000436 J]	0.00184	0.0025 [0.00638]	0.000333 J	0.001	0.000999	0.000362 U	0.000305 J	0.00108	0.00144	0.0000579 U
OCDD	ug/kg	21.1 EJ [23.9 EJ]	24.5 EJ	7.67 EJ [8.5 EJ]	25.7 EJ	15.7 EJ	26.8 EJ	14.8 EJ	13.4 EJ	31.3 EJ	47.2 EDJ	0.214
OCDF	ug/kg	0.421 [0.351]	0.523	0.186 [0.187]	0.706	0.238	0.819	0.327	0.254	0.233	1.99	0.000995 J
Total HpCDD	ug/kg	1.47 [2.46]	1.81	0.604 [0.648]	3.07	1.12	2.67	1.16	1.09	1.31	5.29	0.00911
Total HpCDF	ug/kg	0.295 [0.24]	0.483	0.168 [0.187]	0.518	0.197	0.645	0.25	0.192	0.27	1.55	0.000876
Total HxCDD	ug/kg	0.164 [0.235]	0.254	0.0977 [0.124]	0.52	0.124	0.43	0.146	0.15	0.142	0.603	0.0119
Total HxCDF	ug/kg	0.0909 [0.0777]	0.253	0.0796 [0.106]	0.206	0.0837	0.192	0.0717	0.056	0.115	0.453	0.000392
Total PeCDD	ug/kg	0.0227 [0.0203]	0.046	0.0365 [0.0459]	0.0683	0.0211	0.108	0.0209	0.021	0.0239	0.0759	0.0115
Total PeCDF	ug/kg	0.0504 [0.0339]	0.168 PJ	0.0534 [0.0948 J]	0.0436	0.0181	0.0572	0.0114	0.0104	0.0556	0.0984	0.000148
Total TCDD	ug/kg	0.0126 [0.0104]	0.0153	0.0341 [0.0337]	0.00719	0.00729	0.0286	0.00686	0.00589	0.00914	0.0301	0.00468
Total TCDF	ug/kg	0.018 [0.0135]	0.0576	0.0576 [0.104]	0.00874	0.021	0.0272	0.00348	0.0052	0.0229	0.042	0.0000887
2,3,7,8-TCDD TEQ	ug/kg	0.0211 [0.0224]	0.037	0.0134 [0.0175]	0.0606	0.0178	0.0471	0.0178	0.0163	0.0252	0.0799	0.000613

See Notes on Page 3

TABLE 1
VALIDATED ANALYTICAL DATA SUMMARY - AUGUST 2012 SAMPLES

FORMER KOPPERS WOOD-TREATING SITE
CARBONDALE, ILLINOIS

Sample ID:		A1-61	A1-62	A1-63	A3-25	A3-26	A3-27	A3-28	A3-29	A3-30	A3-31	A3-32	A3-33	A3-34
Depth (ft bgs):		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date:	Units	08/08/12	08/08/12	08/08/12	08/09/12	08/09/12	08/09/12	08/09/12	08/08/12	08/09/12	08/09/12	08/08/12	08/09/12	08/09/12
PCDDs/PCDFs														
1,2,3,4,6,7,8-HpCDD	ug/kg	3.12 EJ	81.8 D	0.446	0.715	5 EJ	0.532	343 EDJ	0.249	0.606	1.46	23.9 EDJ [28.6 EJ]	43.1 EDJ	5.16 EJ
1,2,3,4,6,7,8-HpCDF	ug/kg	0.309 J	17.1 EDJ	0.0401	0.0349	0.864	0.0692	68.9 EDJ	0.0147	0.045	0.14	5.5 EJ [5.81 EJ]	7.04 D	0.986
1,2,3,4,7,8,9-HpCDF	ug/kg	0.0234	1.68 D	0.00359	0.00351	0.0697	0.00537	6.06 D	0.00131 J	0.00352	0.00994	0.379 [0.423]	0.586 D	0.076
1,2,3,4,7,8-HxCDD	ug/kg	0.052	0.306	0.00472	0.00533	0.039	0.0069	1.82	0.0034	0.00592	0.0198	0.233 [0.28]	0.199	0.0586
1,2,3,4,7,8-HxCDF	ug/kg	0.0229	0.435	0.00311	0.00257	0.0476	0.00701	1.84	0.0014 J	0.00365	0.00748	0.229 [0.242]	0.273	0.0734
1,2,3,6,7,8-HxCDD	ug/kg	0.123	2.21 EJ	0.0108	0.0145	0.16	0.0179	6.66 EJ	0.00682	0.0131	0.0585	1.01 [1.22]	1.03	0.167
1,2,3,6,7,8-HxCDF	ug/kg	0.00772	0.153	0.00122 J	0.00116 J	0.0255	0.0042	0.98 PJ	0.000675 J	0.00165 J	0.00386	0.132 [0.142]	0.0909	0.0335
1,2,3,7,8,9-HxCDD	ug/kg	0.0801	0.629	0.00923	0.0104	0.0861	0.011	3.02 EJ	0.00666	0.0121	0.0475	0.514 [0.632]	0.36	0.118
1,2,3,7,8,9-HxCDF	ug/kg	0.00211 J	0.0419	0.00034 J	0.000317 UX	0.00997	0.000638 J	0.125	0.000171 J	0.00027 J	0.000771 J	0.0558 [0.0324]	0.0499	0.00516
1,2,3,7,8-PeCDD	ug/kg	0.0229	0.0818	0.00233 J	0.00224 J	0.0175	0.00466	0.616	0.00156 J	0.00228 J	0.0123	0.0837 [0.0968]	0.0626	0.0185
1,2,3,7,8-PeCDF	ug/kg	0.00194 J	0.0108	0.000281 UX	0.000402 J	0.0043	0.00172 J	0.0667	0.000243 J	0.0004 J	0.000973 J	0.0209 [0.0229]	0.0123	0.00517
2,3,4,6,7,8-HxCDF	ug/kg	0.0114	0.341	0.00175 J	0.00203 J	0.049	0.00608	1.84	0.00102 J	0.00254	0.00568	0.24 [0.248]	0.184	0.0548
2,3,4,7,8-PeCDF	ug/kg	0.0031	0.0308 D	0.000772 J	0.000519 UX	0.013	0.00368	0.11	0.000351 J	0.00123 J	0.00161 J	0.0422 [0.0819]	0.0432	0.0167
2,3,7,8-TCDD	ug/kg	0.0036	0.00535	0.000478 UX	0.000361 J	0.00372	0.000808	0.0388	0.000225 UX	0.000341 J	0.00135	0.00305 [0.00375]	0.00384	0.00222
2,3,7,8-TCDF	ug/kg	0.000859	0.00322	0.000233 U	0.000233 UX	0.00369	0.00181	0.00931	0.000253 J	0.000311 J	0.00081	0.00419 [0.00509]	0.00412	0.00352
OCDD	ug/kg	38.6 EJ	727 EDJ	14.9 EJ	34.4 EJ	84 D	13.6 EJ	2,270 EDJ	7.77 EJ	29.4 EJ	22.5 EJ	198 [240 EDJ]	487 EDJ	45.8 EJ
OCDF	ug/kg	2.16	123 EDJ	0.193	0.147	4.62 EJ	0.327	438 EDJ	0.0655	0.219	0.803	27.3 EJ [28.4 EJ]	41.5 EDJ	4.24 EJ
Total HpCDD	ug/kg	6.09	150	0.966	2.28	9	1.12	732	0.593	1.49	3.04	39.3 [47.3 J]	82.3	13
Total HpCDF	ug/kg	1.5 J	92.6 PJ	0.153	0.143	3.71	0.268	337	0.0582	0.18	0.582	20.5 [21.9 J]	33.7	3.66
Total HxCDD	ug/kg	1.38	12.3 J	0.123	0.239	0.914	0.177	55.3	0.092	0.176	0.646	4.77 [6.06]	5.13	1.49
Total HxCDF	ug/kg	0.383	16.5 PJ	0.0482	0.0541	1.14	0.119	72.8 PJ	0.0234	0.06	0.155	6.11 [6.79]	6.13	1.41
Total PeCDD	ug/kg	0.361	0.401	0.0188	0.0579	0.112	0.0873	3.78	0.016	0.0254	0.121	0.448 [0.543]	0.414	0.109
Total PeCDF	ug/kg	0.0681	0.775 PJ	0.00915	0.00494	0.367	0.0707	5.45 PJ	0.00667	0.0124	0.0306	0.911 [1.08]	0.652	0.261 PJ
Total TCDD	ug/kg	0.0991	0.118	0.00472	0.0127	0.0272	0.0793	0.332	0.00685	0.00837	0.0227	0.104 [0.14]	0.102	0.0468
Total TCDF	ug/kg	0.0308	0.111 PJ	0.00318	0.00302	0.101	0.0456	0.45 PJ	0.0052	0.00621	0.0133	0.107 [0.132]	0.0978	0.0701
2,3,7,8-TCDD TEQ	ug/kg	0.104	1.77	0.0151	0.0241	0.153	0.0224	7.31	0.00871	0.0224	0.0517	0.707 [0.835]	0.965	0.155

See Notes on Page 3

TABLE 1
VALIDATED ANALYTICAL DATA SUMMARY - AUGUST 2012 SAMPLES

FORMER KOPPERS WOOD-TREATING SITE
CARBONDALE, ILLINOIS

Notes:

1. Samples A1-52, A1-53, A1-54, A1-55, A1-59 and A1-61 were composites of five discrete sample locations. All remaining samples were collected from a single, discrete location.
2. Sample A1-60 was a sediment sample collected from the Glade Creek channel bottom. All remaining samples were soil samples.

Definitions:

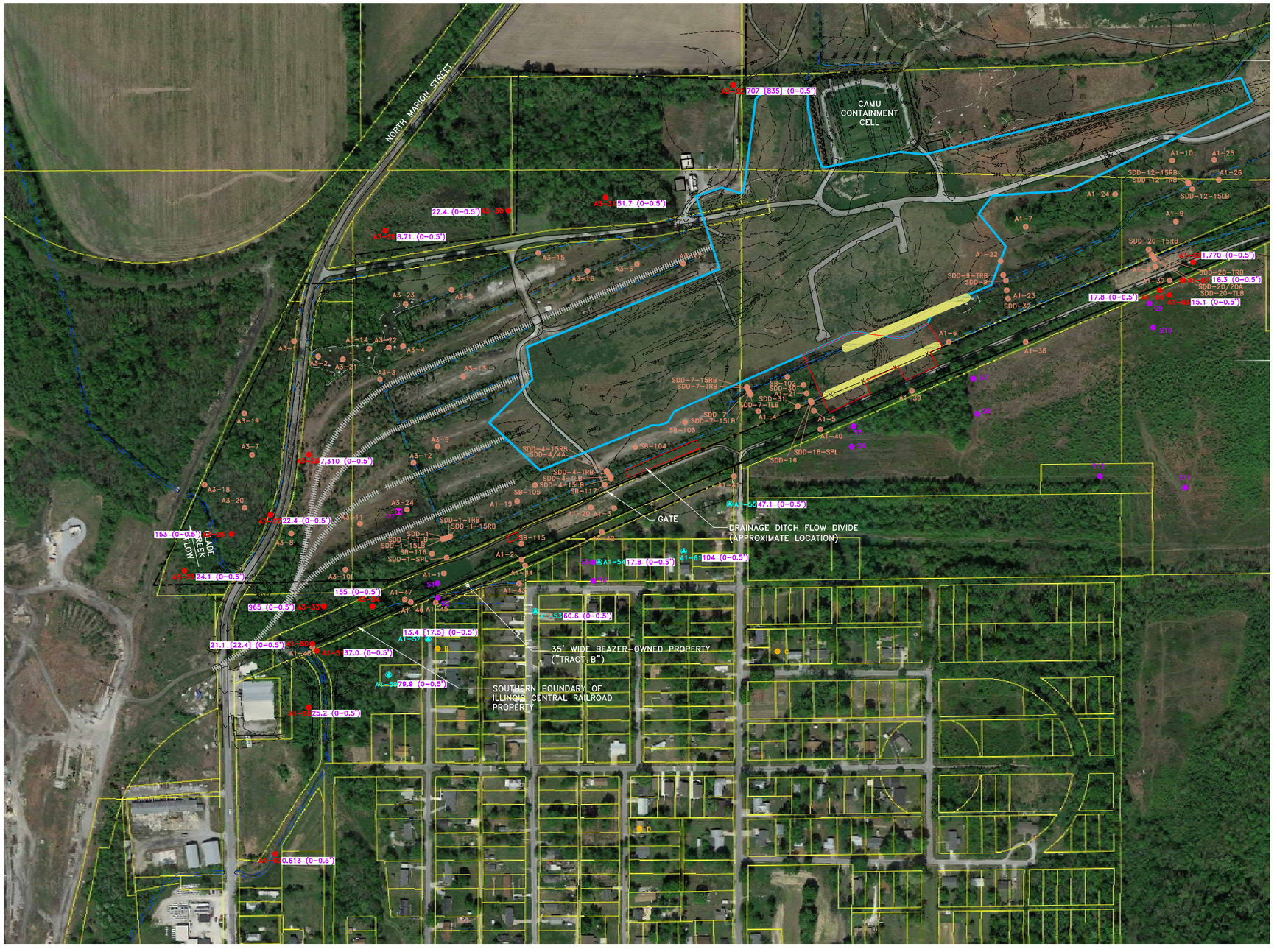
PCDDs/PCDFs = polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans
ug/kg = micrograms per kilogram, or parts per billions (ppb)
ft bgs = feet below ground surface
TEQ = Toxicity Equivalent, calculated using 2005 World Health Organization (WHO) Toxicity Equivalent Factors (TEFs)
[ ] = analytical result for duplicate sample

Data Qualifiers:

D = result based on analysis of diluted sample
E = the amount detected is above the High Calibration Limit
J = the amount detected is below the Low Calibration Limit; or estimated value based on data validation
P = the amount reported is the maximum possible concentration due to possible chlorinated diphenylether interference
U = compound not detected; reported value is the sample specific estimated detection limit
UX = non-detect; reported value is the estimated maximum possible concentration

Attachment 2

Sample Location Maps



LEGEND:

- EDGE OF WATER
- DRAINAGE DITCH AND DIRECTION OF FLOW
- PROPERTY BOUNDARY (SEE NOTE 2)
- PARCEL BOUNDARY
- FENCELINE
- EXISTING CONTOUR LINE
- FORMER PROCESS AREA SURFACE COVER
- SOIL REMOVAL AREA (SOIL/DEBRIS PILES AND SURFICIAL ASPHALT-LIKE MATERIALS)
- PORTIONS OF SOUTHERN DRAINAGE DITCHES THAT HAVE BEEN FILLED IN PRIOR TO OR DURING SURFACE COVER CONSTRUCTION OR REMOVAL OF SOIL AND DEBRIS PILES.
- S1 2005 RESIDENTIAL SAMPLE LOCATIONS (USEPA)
- SB-102 2005-2010 SAMPLE LOCATIONS (BEAZER)
- B 2006 RESIDENTIAL SAMPLE LOCATIONS (CITY OF CARBONDALE)
- A1-57 2012 GRAB SAMPLE LOCATION
- A1-55 2012 COMPOSITE SAMPLE LOCATION
- 15.1 (0-0.5') TCDD-TEQ CONCENTRATION (ppt) AND SAMPLE DEPTH INTERVAL

NOTES:

1. SITE FEATURES AND TOPOGRAPHY OBTAINED FROM PHOTOGRAMMETRIC MAPPING PROVIDED BY LOCKWOOD MAPPING COMPANY IN SEPTEMBER 2001 AND SURVEY DATA PROVIDED BY ENGINEERING DESIGN SOURCE, INC. IN JANUARY 2004, AND BASED ON AERIAL PHOTOGRAPHY PROVIDED BY LOCKWOOD MAPPING, INC. TAKEN ON NOVEMBER 22, 1996 AT AN APPROXIMATE SCALE OF 1"=500'. TOPOGRAPHY IN THE EASTERN SOUTHERN DRAINAGE DITCHES AREA BASED ON TOPOGRAPHIC FIELD SURVEY CONDUCTED IN AUGUST 2007.
2. PROPERTY BOUNDARY IS APPROXIMATE; OBTAINED FROM A COMBINATION OF SITE SURVEY DATA, HISTORICAL MAPS AND TAX MAPS.
3. THE 2006 RESIDENTIAL SAMPLE LOCATIONS ARE APPROXIMATE.
4. AERIAL IMAGE OBTAINED FROM GOOGLE EARTH AND DATED APRIL 2, 2012.
5. TCDD-TEQ CONCENTRATIONS ARE BASED ON UNVALIDATED LABORATORY RESULTS.

0 200' 400'
GRAPHIC SCALE

BEAZER EAST, INC.
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

AUGUST 2012 SAMPLE LOCATIONS AND TCDD-TEQ CONCENTRATIONS

ARCADIS

FIGURE 1

CITY:(MANCHESTER) SYRACUSE DIV/GROUP:ENVCAD DB:(B.SMALL) G.STOWELL L.FORAKER LD: PIC:R.ANDERSON PM:J.HOLDEN TM:D.BESSINGPAS
G:\ENVCAD\SYRACUSE\ACT\B0039262\0000000003\DWG\AUGUST 2012\39262G01.DWG LAYOUT: 1 SAVED: 10/11/2012 1:31 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: C-L02B PDF 3600 DPI PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 10/11/2012 1:31 PM BY: FORAKER, LYDIA
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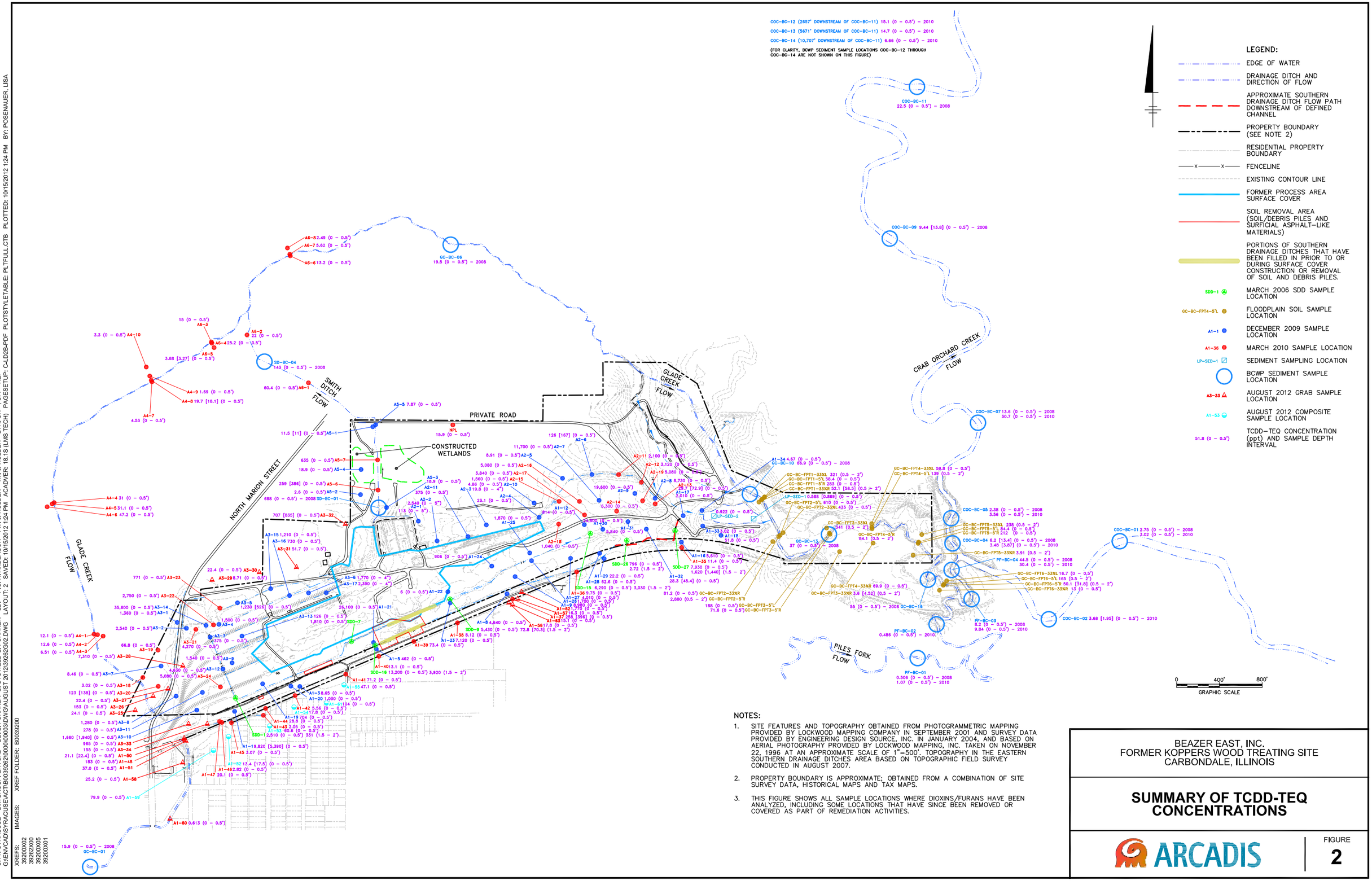
IMAGES: XREF FOLDER: B1039200
39200X02.jpg



NOTES:

1. SITE FEATURES AND TOPOGRAPHY OBTAINED FROM PHOTOGRAMMETRIC MAPPING PROVIDED BY LOCKWOOD MAPPING COMPANY IN SEPTEMBER 2001 AND SURVEY DATA PROVIDED BY ENGINEERING DESIGN SOURCE, INC. IN JANUARY 2004, AND BASED ON AERIAL PHOTOGRAPHY PROVIDED BY LOCKWOOD MAPPING, INC. TAKEN ON NOVEMBER 22, 1996 AT AN APPROXIMATE SCALE OF 1"=500'. TOPOGRAPHY IN THE EASTERN SOUTHERN DRAINAGE DITCHES AREA BASED ON TOPOGRAPHIC FIELD SURVEY CONDUCTED IN AUGUST 2007.
2. PROPERTY BOUNDARY IS APPROXIMATE; OBTAINED FROM A COMBINATION OF SITE SURVEY DATA, HISTORICAL MAPS AND TAX MAPS.
3. THIS FIGURE SHOWS ALL SAMPLE LOCATIONS WHERE DIOXINS/FURANS HAVE BEEN ANALYZED, INCLUDING SOME LOCATIONS THAT HAVE SINCE BEEN REMOVED OR COVERED AS PART OF REMEDIATION ACTIVITIES.

BEAZER EAST, INC.
FORMER KOPPERS WOOD TREATING SITE
CARBONDALE, ILLINOIS

SUMMARY OF TCDD-TEQ CONCENTRATIONS

ARCADIS

FIGURE 2

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: L. FORAKER G. STOWELL L. FORAKER LD: PIC: R. ANDERSON PM: J. HOLDEN TM: J. HOLDEN LYR: ON=*; OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVITY\B0039262\000\0000003\DWG\AUGUST 2012\39262G02.DWG LAYOUT: 2 SAVED: 10/15/2012 1:24 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: C-L02B-PDF PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 10/15/2012 1:24 PM BY: POSENAUER, LISA
XREFS: 39200X02 39262X00 39200X05 39200X01
IMAGES: XREF FOLDER: B0039200

Attachment 3

Data Validation Reports

ARCADIS
Infrastructure, environment, facilities

Imagine the result

Beazer East Inc.

Former Koppers Wood-Treating Site

Data Review

CARBONDALE, ILLINOIS

Dioxins/Furans Analyses

SDG # 33932

Analyses Performed By:
Vista Analytical Laboratories
El Dorado Hills, California

Report #17380
Review Level: Tier III
Project: B0039262.0000.00003

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 33932 for samples collected in association with the Beazer East Inc. Former Koppers Wood-Treating Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis
					Dioxins/Furans
A1-62	33932-001	Soil	8/8/2012		X
A1-56	33932-002	Soil	8/8/2012		X
A1-57	33932-003	Soil	8/8/2012		X
A1-63	33932-004	Soil	8/8/2012		X
A1-52	33932-005	Soil	8/8/2012		X
A1-53	33932-006	Soil	8/8/2012		X
A1-59	33932-007	Soil	8/8/2012		X
A1-54	33932-008	Soil	8/8/2012		X
A1-55	33932-009	Soil	8/8/2012		X
A1-60	33932-010	Soil	8/8/2012		X
DUP-1	33932-011	Soil	8/8/2012	A1-52	X
DUP-2	33932-012	Soil	8/8/2012	A3-32	X
EB 8/8/12	33932-013	Water	8/8/2012		X

1. The matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location A1-55.
2. Sample results were reported on a dry-weight basis.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8290. Data were reviewed in accordance with USEPA National Functional Guidelines of January 2005.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected as unusable. The analyte may or may not be present in the sample.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

POLYCHLORINATED DIBENZODIOXINS AND POLYCHLORINATED DIBENZOFURANS (PCDD/PCDF) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8290	Water	30 days from collection to extraction and 45 days from extraction to analysis	Cooled @ 4±2 °C
	Soil	30 days from collection to extraction and 45 days from extraction to analysis	Cooled @ 4±2 °C

The samples were received at the laboratory at acceptable temperatures and all samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment rinse blanks also measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in an associated method blank (which was analyzed with SDG 33932); however, the associated sample results were either greater than the BAL or non-detect. Therefore, qualification of the sample results was not required.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable; system performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

A maximum relative standard deviation (RSD) of 20% is allowed for all non-labeled compounds (target) and 30% is allowed for all labeled compounds (internal standards and recovery standards)

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibited percent difference (%D) less than the control limit (20%).

All initial and continuing calibration criteria were within the control limits.

5. Internal Standard Performance

All samples to be analyzed for PCDD/PCDF compounds are spiked with internal standards prior to extraction. Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds exhibit recoveries within the control limits of 40% to 135%.

Sample locations associated with internal standards exhibiting responses outside of the control limits are presented in the following table.

Sample Locations	Internal Standard	Response
A1-62	^{13}C-OCDD	<LL but >40%

The criteria used to evaluate the internal standard responses are presented in the following table. In the case of an internal standard deviation, the compounds quantitated under the deviant internal standard are qualified as documented in the table below.

Control limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No action
	Detect	J
< the lower control limit (LL) but > 40%	Non-detect	J
	Detect	J
< 25%	Non-detect	R
	Detect	J

6. Recovery Standard Performance

The recovery standard (^{37}Cl-2,3,7,8-TCDD) is added to the sample extract prior to the extract clean-up steps. The concentrations of the labeled standards (internal standards) are determined using the recovery standard.

All recovery standard recoveries were acceptable.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds spiked in the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent differences (RPDs) between the MS and MSD must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compounds concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD exhibited acceptable recoveries and RPD between the MS/MSD recoveries.

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit recoveries within the laboratory-established acceptance limits.

All compounds associated with the LCS analyses exhibited recoveries within the control limits.

9. Field Duplicate Sample Analysis

Field duplicate analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 100% for soil matrices is applied to the RPD between the parent and the field duplicate samples. In the case where the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results (in ug/kg) for the field duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
A1-52/ DUP-1	1,2,3,4,6,7,8-HpCDD	0.309	0.325	5.0%
	1,2,3,4,6,7,8-HpCDF	0.062	0.0721	15.0%
	1,2,3,4,7,8,9-HpCDF	0.00397	0.00563	34.5%
	1,2,3,4,7,8-HxCDD	0.00357	0.00364	1.9%
	1,2,3,4,7,8-HxCDF	0.00585	0.0121	69.6%
	1,2,3,6,7,8-HxCDD	0.0101	0.0121	18.0%
	1,2,3,6,7,8-HxCDF	0.00339	0.00681	67.0%
	1,2,3,7,8,9-HxCDD	0.00761	0.00847	10.6%
	1,2,3,7,8,9-HxCDF	0.000312 J	0.000913 J	98.1%
	1,2,3,7,8-PeCDD	0.00235 J	0.00295	22.6%
	1,2,3,7,8-PeCDF	0.00214 J	0.00811	116.4%
	2,3,4,6,7,8-HxCDF	0.00417	0.00582	33.0%
	2,3,4,7,8-PeCDF	0.00229 J	0.00456	66.2%
	2,3,7,8-TCDD	0.000491 J	0.000675	31.5%
	2,3,7,8-TCDF	0.0025	0.00638	87.3%
	37Cl-2,3,7,8-TCDD	0.0808	0.0776	4.0%

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
	OCDD	7.67 E	8.5 E	10.2%
	OCDF	0.186	0.187	0.5%
	TEQ(Min)	0.0134	0.0175	26.5%
	Total HpCDD	0.604	0.648	7.0%
	Total HpCDF	0.168	0.187	10.7%
	Total HxCDD	0.0977	0.124	23.7%
	Total HxCDF	0.0796	0.106	28.4%
	Total PeCDD	0.0365	0.0459	22.8%
	Total PeCDF	0.0534	0.0948	55.8%
	Total TCDD	0.0341	0.0337	1.1%
	Total TCDF	0.0576	0.104	57.4%
	WHO Dioxin TEQ(Human/Mammal-NDs Excluded)	0.0134	0.0175	26.5%
	WHO Dioxin TEQ(Human/Mammal-NDs used at 1/2 DL)	0.0134	0.0175	26.5%
A3-32/ DUP-2	1,2,3,4,6,7,8-HpCDD	23.9	28.6	17.9%
	1,2,3,4,6,7,8-HpCDF	5.5	5.81	5.4%
	1,2,3,4,7,8,9-HpCDF	0.379	0.423	10.9%
	1,2,3,4,7,8-HxCDD	0.233	0.28	18.3%
	1,2,3,4,7,8-HxCDF	0.229	0.242	5.5%
	1,2,3,6,7,8-HxCDD	1.01	1.22	18.8%
	1,2,3,6,7,8-HxCDF	0.132	0.142	7.2%
	1,2,3,7,8,9-HxCDD	0.514	0.632	20.5%
	1,2,3,7,8,9-HxCDF	0.0558	0.0324	53.0%
	1,2,3,7,8-PeCDD	0.0837	0.0968	14.5%
	1,2,3,7,8-PeCDF	0.0209	0.0229	9.1%
	2,3,4,6,7,8-HxCDF	0.24	0.248	3.2%
	2,3,4,7,8-PeCDF	0.0422	0.0819	63.9%
	2,3,7,8-TCDD	0.00305	0.00375	20.5%
	2,3,7,8-TCDF	0.00419	0.00509	19.3%
	37Cl-2,3,7,8-TCDD	0.0747	0.0781	4.4%
	OCDD	198	240	19.1%
	OCDF	27.3	28.4	3.9%
	TEQ(Min)	0.707	0.835	16.6%
	Total HpCDD	39.3	47.3	18.4%
	Total HpCDF	20.5	21.9	6.6%
	Total HxCDD	4.77	6.06	23.8%
	Total HxCDF	6.11	6.79	10.5%
	Total PeCDD	0.448	0.543	19.1%
	Total PeCDF	0.911	1.08	16.9%

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
	Total TCDD	0.104	0.14	29.5%
	Total TCDF	0.107	0.132	20.9%
	WHO Dioxin TEQ(Human/Mammal-NDs Excluded)	0.707	0.835	16.6%
	WHO Dioxin TEQ(Human/Mammal-NDs used at 1/2 DL)	0.707	0.835	16.6%

AC Acceptable

The compound 1,2,3,7,8-PeCDF associated with samples locations A1-52 and DUP-1 exhibited a RPD greater than the control limit. The compound 1,2,3,7,8-PeCDF results for sample locations A1-52 and DUP-1 were qualified as estimated ("J").

10. Compound Identification

PCDD/PCDF compounds are identified by using the compound's ion abundance ratios, signal-to-noise ratios, and retention times relative to the internal standards'.

An estimated maximum possible concentration (EMPC) designation is given to compounds which have signals eluting within the established retention time window which would, if positively identified, be greater than the detection limit. The signals do not, however, meet the ion abundance ratio criteria and therefore cannot be identified as the compound of interest. The EMPC value is the estimated concentration of the interferant quantitated "as the compound of interest". This value should be considered an elevated detection limit based on potential compound identification and quantitation interference. The "UX" qualifier has been added to the following sample results (in ug/kg) to indicate the elevated detection limit as EMPC.

Sample ID	Compound	Laboratory Result	Reported Result
A1-57	1,2,3 ,7,8,9-HxCDF	0.0019 EMPC	0.0019 UX
A1-56	1,2,3,7,8-PeCDF	0.00037 EMPC	0.00037 UX
A1-63	1,2,3,7,8-PeCDF	0.000281 EMPC	0.000281 UX
	2,3,7,8-TCDD	0.000478 EMPC	0.000478 UX

The following results exhibited evidence of interference by chlorodiphenyl ethers. The results were flagged "P" by the laboratory indicating the result is the maximum concentrations of the analytes in the case that all of the quantified area is due to the target analyte and none due to the interference. Therefore, these results have been qualified as estimated ("J").

Sample ID	Compound
A1-62	Total TCDF Total PeCDF Total HxCDF Total HpCDF

Sample results that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table (ug/kg).

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
A1-62	1,2,3,6,7,8-HxCDD	2.210 E	—	2.210 EJ
	OCDD	727 ED	—	727 EDJ
	1,2,3,4,6,7,8-HpCDF	17.1 ED	—	17.1 EDJ
	OCDF	123 ED	—	123 EDJ
A1-57	OCDD	13.4 E	—	13.4 EJ
A1-52	OCDD	7.67 E	—	7.67 EJ
A1-53	OCDD	25.7 E	—	25.7 EJ
A1-59	1,2,3,4,6,7,8-HpCDD	2.85 E	—	2.85 EJ
	OCDD	47.2 ED	—	47.2 EDJ
A1-54	OCDD	15.7 E	—	15.7 EJ
A1-55	OCDD	26.8 E	—	26.8 EJ
DUP-1	OCDD	8.5 E	—	8.5 EJ
DUP-2	1,2,3,4,6,7,8-HpCDD	28.6 E	—	28.6 EJ
	OCDD	240 ED	—	240 EDJ
	1,2,3,4,6,7,8-HpCDF	5.81 E	—	5.81 EJ
	OCDF	28.4 E	—	28.4 EJ
A1-56	OCDD	14.8 E	—	14.8 EJ
A1-63	OCDD	14.9 E	—	14.9 EJ

Note: In the instance where both the original analysis and the diluted analysis sample results exhibited a concentration greater than and/or less than the calibration linear range of the instrument; the sample result exhibiting the greatest concentration will be reported as the final result.

Sample results associated with compounds exhibiting concentration greater than the linear range qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range	D
Diluted sample result less than the calibration range	DJ
Diluted sample result greater than the calibration range	EDJ
Original sample result greater than the calibration range	EJ

11. System Performance and Overall Assessment

Please note that when individual compounds are qualified as estimated (J) during validation, this qualification is applied to the totals as well.

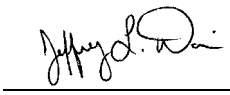
Overall system performance was acceptable. Except for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PCDD/PCDF

PCDDs/PCDFs; SW-846 8290	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X		X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X	
Laboratory Control Sample Duplicate (LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD RPD		X		X	
Field/Laboratory Duplicate Sample RPD		X	X		
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Signal-to-noise ratio $\geq$ 10:1		X		X	
Internal standard performance		X	X		
Recovery standard performance		X		X	
Resolution mix $\leq$ 25%		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

RSD – relative standard deviation
%R - percent recovery
RPD - relative percent difference
%D – difference

VALIDATION PERFORMED BY: Jeffrey L. Davin

SIGNATURE: 

DATE: September 27, 2012

PEER REVIEW: Dennis Capria

DATE: October 1, 2012

CHAIN OF CUSTODY /
CORRECTED SAMPLE ANALYSIS DATA SHEETS

Sample ID: A1-62 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-001	Date Received:	10-Aug-12
Project:		Sample Size:	13.8 g	QC Batch No.:	4618	Date Extracted:	15-Aug-12
Date Collected:	8-Aug-12	%Solids:	73.3	Date Analyzed DB-5:	20-Aug-12	Dates Analyzed DB-225:	21-Aug-12
Time Collected:	0805						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	5.35			
1,2,3,7,8-PeCDD	81.8			
1,2,3,4,7,8-HxCDD	306			
1,2,3,6,7,8-HxCDD	2210			E J
1,2,3,7,8,9-HxCDD	629			
1,2,3,4,6,7,8-HpCDD	81800			D
OCDD	727000			D,E J
2,3,7,8-TCDF	3.22			
1,2,3,7,8-PeCDF	10.8			
2,3,4,7,8-PeCDF	30.8			D
1,2,3,4,7,8-HxCDF	435			
1,2,3,6,7,8-HxCDF	153			
2,3,4,6,7,8-HxCDF	341			
1,2,3,7,8,9-HxCDF	41.9			
1,2,3,4,6,7,8-HpCDF	17100			D,E J
1,2,3,4,7,8,9-HpCDF	1680			D
OCDF	123000			D,E J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	96.0	40 - 135	
	13C-1,2,3,7,8-PeCDD	99.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	80.9	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	86.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	75.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	80.9	40 - 135	D
	13C-OCDD	34.8	40 - 135	D,H
	13C-2,3,7,8-TCDF	92.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	107	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	D
	13C-1,2,3,4,7,8-HxCDF	93.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	97.0	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	90.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	90.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	87.5	40 - 135	D
	13C-1,2,3,4,7,8,9-HpCDF	86.9	40 - 135	D
	13C-OCDF	74.1	40 - 135	D
CRS	37Cl-2,3,7,8-TCDD	103	40 - 135	

Totals			
Total TCDD	118	118	
Total PeCDD	401		
Total HxCDD	12300		J
Total HpCDD	150000		
Total TCDF	111		P J
Total PeCDF	775	822	P J
Total HxCDF	16500		P J
Total HpCDF	92600		P J

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 1770

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 30-Aug-2012 14:56

Sample ID: A1-57 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-003	Date Received:	10-Aug-12
Project:		Sample Size:	12.6 g	QC Batch No.:	4618	Date Extracted:	15-Aug-12
Date Collected:	8-Aug-12	%Solids:	79.7	Date Analyzed DB-5:	20-Aug-12	Date Analyzed DB-225:	NA
Time Collected:	0830						

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	0.636			
1,2,3,7,8-PeCDD	2.47			J
1,2,3,4,7,8-HxCDD	5.54			
1,2,3,6,7,8-HxCDD	12.8			
1,2,3,7,8,9-HxCDD	10.0			
1,2,3,4,6,7,8-HpCDD	488			
OCDD	13400			E J
2,3,7,8-TCDF	0.305			J
1,2,3,7,8-PeCDF	0.326			J
2,3,4,7,8-PeCDF	0.711			J
1,2,3,4,7,8-HxCDF	3.34			
1,2,3,6,7,8-HxCDF	1.21			J
2,3,4,6,7,8-HxCDF	2.02			J
1,2,3,7,8,9-HxCDF	ND		0.190	UX
1,2,3,4,6,7,8-HpCDF	46.5			
1,2,3,4,7,8,9-HpCDF	4.20			
OCDF	254			

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	92.0	40 - 135	
	13C-1,2,3,7,8-PeCDD	95.5	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	78.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	82.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	79.5	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	84.8	40 - 135	
	13C-OCDD	96.1	40 - 135	
	13C-2,3,7,8-TCDF	90.6	40 - 135	
	13C-1,2,3,7,8-PeCDF	105	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	87.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	92.1	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	90.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	86.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	86.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	86.3	40 - 135	
	13C-OCDF	90.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	99.7	40 - 135	

Totals		
Total TCDD	5.89	6.15
Total PeCDD	21.0	
Total HxCDD	150	
Total HpCDD	1090	
Total TCDF	5.20	5.66
Total PeCDF	10.4	10.6
Total HxCDF	56.0	56.4
Total HpCDF	192	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 16.3

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: FEB

Approved By: Calvin Tanaka 30-Aug-2012 14:46

Sample ID: A1-52 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-005	Date Received:	10-Aug-12
Project:		Sample Size:	13.3 g	QC Batch No.:	4618	Date Extracted:	15-Aug-12
Date Collected:	8-Aug-12	%Solids:	75.3	Date Analyzed DB-5:	21-Aug-12	Dates Analyzed DB-225:	21-Aug-12
Time Collected:	0920						

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	0.491			J
1,2,3,7,8-PeCDD	2.35			J
1,2,3,4,7,8-HxCDD	3.57			
1,2,3,6,7,8-HxCDD	10.1			
1,2,3,7,8,9-HxCDD	7.61			
1,2,3,4,6,7,8-HpCDD	309			
OCDD	7670			E J
2,3,7,8-TCDF	2.50			
1,2,3,7,8-PeCDF	2.14			J
2,3,4,7,8-PeCDF	2.29			J
1,2,3,4,7,8-HxCDF	5.85			
1,2,3,6,7,8-HxCDF	3.39			
2,3,4,6,7,8-HxCDF	4.17			
1,2,3,7,8,9-HxCDF	0.312			J
1,2,3,4,6,7,8-HpCDF	62.0			
1,2,3,4,7,8,9-HpCDF	3.97			
OCDF	186			

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	90.6	40 - 135	
	13C-1,2,3,7,8-PeCDD	93.8	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	75.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	84.7	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	78.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	83.4	40 - 135	
	13C-OCDD	94.9	40 - 135	
	13C-2,3,7,8-TCDF	90.1	40 - 135	
	13C-1,2,3,7,8-PeCDF	103	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	85.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	91.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	87.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	84.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	85.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	83.7	40 - 135	
	13C-OCDF	90.3	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	101	40 - 135	

Totals		
Total TCDD	34.1	
Total PeCDD	36.5	
Total HxCDD	97.7	
Total HpCDD	604	
Total TCDF	57.6	58.4
Total PeCDF	53.4	53.6
Total HxCDF	79.6	
Total HpCDF	168	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 13.4

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 30-Aug-2012 14:46

Sample ID: A1-53 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-006	Date Received:	10-Aug-12
Project:		Sample Size:	11.9 g	QC Batch No.:	4618	Date Extracted:	15-Aug-12
Date Collected:	8-Aug-12	%Solids:	83.8	Date Analyzed DB-5:	21-Aug-12	Date Analyzed DB-225:	NA
Time Collected:	0935						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	1.18			
1,2,3,7,8-PeCDD	15.7			
1,2,3,4,7,8-HxCDD	26.4			
1,2,3,6,7,8-HxCDD	57.9			
1,2,3,7,8,9-HxCDD	66.4			
1,2,3,4,6,7,8-HpCDD	1590			
OCDD	25700			EJ
2,3,7,8-TCDF	0.333			J
1,2,3,7,8-PeCDF	0.782			J
2,3,4,7,8-PeCDF	1.49			J
1,2,3,4,7,8-HxCDF	5.97			
1,2,3,6,7,8-HxCDF	6.70			
2,3,4,6,7,8-HxCDF	9.26			
1,2,3,7,8,9-HxCDF	0.585			J
1,2,3,4,6,7,8-HpCDF	194			
1,2,3,4,7,8,9-HpCDF	8.83			
OCDF	706			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	93.4	40 - 135	
	13C-1,2,3,7,8-PeCDD	97.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	76.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	84.7	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	78.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	87.8	40 - 135	
	13C-OCDD	101	40 - 135	
	13C-2,3,7,8-TCDF	92.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	107	40 - 135	
	13C-2,3,4,7,8-PeCDF	104	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	88.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	92.0	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	90.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	85.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	85.7	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	85.9	40 - 135	
	13C-OCDF	93.4	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	100	40 - 135	

Totals		
Total TCDD	7.19	
Total PeCDD	68.3	
Total HxCDD	520	
Total HpCDD	3070	
Total TCDF	8.74	9.73
Total PeCDF	43.6	
Total HxCDF	206	
Total HpCDF	518	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 60.5

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 30-Aug-2012 14:46

Sample ID: A1-59 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-007	Date Received:	10-Aug-12
Project:		Sample Size:	12.6 g	QC Batch No.:	4618	Date Extracted:	15-Aug-12
Date Collected:	8-Aug-12	%Solids:	79.9	Date Analyzed DB-5:	21-Aug-12	Dates Analyzed DB-225:	21-Aug-12
Time Collected:	0955						

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	0.761			
1,2,3,7,8-PeCDD	9.60			
1,2,3,4,7,8-HxCDD	24.1			
1,2,3,6,7,8-HxCDD	83.4			
1,2,3,7,8,9-HxCDD	53.6			
1,2,3,4,6,7,8-HpCDD	2850			E J
OCDD	47200			D,E J
2,3,7,8-TCDF	1.44			
1,2,3,7,8-PeCDF	1.64			J
2,3,4,7,8-PeCDF	2.91			
1,2,3,4,7,8-HxCDF	16.0			
1,2,3,6,7,8-HxCDF	9.51			
2,3,4,6,7,8-HxCDF	16.4			
1,2,3,7,8,9-HxCDF	1.52			J
1,2,3,4,6,7,8-HpCDF	452			
1,2,3,4,7,8,9-HpCDF	27.9			
OCDF	1990			

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	93.0	40 - 135	
	13C-1,2,3,7,8-PeCDD	95.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	78.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	84.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	79.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	90.6	40 - 135	
	13C-OCDD	75.9	40 - 135	D
	13C-2,3,7,8-TCDF	93.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	106	40 - 135	
	13C-2,3,4,7,8-PeCDF	104	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	87.9	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	93.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	89.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	87.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	85.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	87.0	40 - 135	
	13C-OCDF	99.1	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	97.8	40 - 135	

Totals		
Total TCDD	30.1	
Total PeCDD	75.9	
Total HxCDD	603	
Total HpCDD	5290	
Total TCDF	42.0	43.4
Total PeCDF	98.4	
Total HxCDF	453	
Total HpCDF	1550	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 80.0

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 30-Aug-2012 14:56

Sample ID: A1-54 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-008	Date Received:	10-Aug-12
Project:		Sample Size:	11.4 g	QC Batch No.:	4618	Date Extracted:	15-Aug-12
Date Collected:	8-Aug-12	%Solids:	88.2	Date Analyzed DB-5:	21-Aug-12	Dates Analyzed DB-225:	21-Aug-12
Time Collected:	1040						

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	0.654			
1,2,3,7,8-PeCDD	1.97			J
1,2,3,4,7,8-HxCDD	3.67			
1,2,3,6,7,8-HxCDD	12.9			
1,2,3,7,8,9-HxCDD	8.93			
1,2,3,4,6,7,8-HpCDD	545			
OCDD	15700			EJ
2,3,7,8-TCDF	1.00			
1,2,3,7,8-PeCDF	1.02			J
2,3,4,7,8-PeCDF	1.44			J
1,2,3,4,7,8-HxCDF	4.15			
1,2,3,6,7,8-HxCDF	2.89			
2,3,4,6,7,8-HxCDF	4.00			
1,2,3,7,8,9-HxCDF	0.614			J
1,2,3,4,6,7,8-HpCDF	63.9			
1,2,3,4,7,8,9-HpCDF	4.25			
OCDF	238			

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	94.0	40 - 135	
	13C-1,2,3,7,8-PeCDD	96.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	78.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	82.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	78.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	84.0	40 - 135	
	13C-OCDD	97.1	40 - 135	
	13C-2,3,7,8-TCDF	91.9	40 - 135	
	13C-1,2,3,7,8-PeCDF	102	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	86.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	92.5	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	88.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	86.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	84.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	85.8	40 - 135	
	13C-OCDF	89.3	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	99.6	40 - 135	

Totals		
Total TCDD	7.29	7.57
Total PeCDD	21.1	
Total HxCDD	124	
Total HpCDD	1120	
Total TCDF	21.0	21.7
Total PeCDF	18.1	
Total HxCDF	83.7	84.0
Total HpCDF	197	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 17.8

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 30-Aug-2012 14:46

Sample ID: A1-55 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-009	Date Received:	10-Aug-12
Project:		Sample Size:	12.1 g	QC Batch No.:	4618	Date Extracted:	15-Aug-12
Date Collected:	8-Aug-12	%Solids:	83.3	Date Analyzed DB-5:	21-Aug-12	Dates Analyzed DB-225:	21-Aug-12
Time Collected:	1115						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	1.30			
1,2,3,7,8-PeCDD	8.59			
1,2,3,4,7,8-HxCDD	15.9			
1,2,3,6,7,8-HxCDD	50.0			
1,2,3,7,8,9-HxCDD	31.5			
1,2,3,4,6,7,8-HpCDD	1470			
OCDD	26800			E J
2,3,7,8-TCDF	0.999			
1,2,3,7,8-PeCDF	1.21			J
2,3,4,7,8-PeCDF	2.43			J
1,2,3,4,7,8-HxCDF	6.35			
1,2,3,6,7,8-HxCDF	4.30			
2,3,4,6,7,8-HxCDF	7.21			
1,2,3,7,8,9-HxCDF	0.928			J
1,2,3,4,6,7,8-HpCDF	165			
1,2,3,4,7,8,9-HpCDF	12.2			
OCDF	819			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	91.2	40 - 135	
	13C-1,2,3,7,8-PeCDD	93.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	76.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	84.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	78.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	86.5	40 - 135	
	13C-OCDD	103	40 - 135	
	13C-2,3,7,8-TCDF	88.1	40 - 135	
	13C-1,2,3,7,8-PeCDF	105	40 - 135	
	13C-2,3,4,7,8-PeCDF	101	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	86.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	91.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	87.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	86.5	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	83.7	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	84.4	40 - 135	
	13C-OCDF	96.8	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	99.8	40 - 135	

Totals		
Total TCDD	28.6	
Total PeCDD	108	
Total HxCDD	430	
Total HpCDD	2670	
Total TCDF	27.2	28.1
Total PeCDF	57.2	
Total HxCDF	192	
Total HpCDF	645	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 47.1

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 30-Aug-2012 14:46

Sample ID: A1-60 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-010	Date Received:	10-Aug-12
Project:		Sample Size:	13.6 g	QC Batch No.:	4618	Date Extracted:	15-Aug-12
Date Collected:	8-Aug-12	%Solids:	74.6	Date Analyzed DB-5:	21-Aug-12	Date Analyzed DB-225:	NA
Time Collected:	1330						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.291			J
1,2,3,7,8-PeCDD	0.188			J
1,2,3,4,7,8-HxCDD	ND	0.129		
1,2,3,6,7,8-HxCDD	ND	0.153		
1,2,3,7,8,9-HxCDD	0.240			J
1,2,3,4,6,7,8-HpCDD	4.23			
OCDD	214			
2,3,7,8-TCDF	ND	0.0579		
1,2,3,7,8-PeCDF	ND	0.0424		
2,3,4,7,8-PeCDF	ND	0.0449		
1,2,3,4,7,8-HxCDF	ND	0.0584		
1,2,3,6,7,8-HxCDF	ND	0.0556		
2,3,4,6,7,8-HxCDF	ND	0.0644		
1,2,3,7,8,9-HxCDF	ND	0.0858		
1,2,3,4,6,7,8-HpCDF	0.297			J
1,2,3,4,7,8,9-HpCDF	ND	0.115		
OCDF	0.995			J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	93.8	40 - 135	
	13C-1,2,3,7,8-PeCDD	98.5	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	81.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	83.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	81.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	84.9	40 - 135	
	13C-OCDD	84.4	40 - 135	
	13C-2,3,7,8-TCDF	93.1	40 - 135	
	13C-1,2,3,7,8-PeCDF	108	40 - 135	
	13C-2,3,4,7,8-PeCDF	105	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	88.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	93.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	90.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	89.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	86.3	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	84.2	40 - 135	
	13C-OCDF	85.3	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	100	40 - 135	

Totals	
Total TCDD	4.68
Total PeCDD	11.5
Total HxCDD	11.9
Total HpCDD	9.11
Total TCDF	0.0887
Total PeCDF	0.148
Total HxCDF	0.392
Total HpCDF	0.876

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 0.613

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 30-Aug-2012 14:46

Sample ID: DUP-1 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-011	Date Received:	10-Aug-12
Project:		Sample Size:	13.4 g	QC Batch No.:	4618	Date Extracted:	15-Aug-12
Date Collected:	8-Aug-12	%Solids:	74.5	Date Analyzed DB-5:	21-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	0000						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.675			
1,2,3,7,8-PeCDD	2.95			
1,2,3,4,7,8-HxCDD	3.64			
1,2,3,6,7,8-HxCDD	12.1			
1,2,3,7,8,9-HxCDD	8.47			
1,2,3,4,6,7,8-HpCDD	325			
OCDD	8500			E J
2,3,7,8-TCDF	6.38			
1,2,3,7,8-PeCDF	8.11			J
2,3,4,7,8-PeCDF	4.56			
1,2,3,4,7,8-HxCDF	12.1			
1,2,3,6,7,8-HxCDF	6.81			
2,3,4,6,7,8-HxCDF	5.82			
1,2,3,7,8,9-HxCDF	0.913			J
1,2,3,4,6,7,8-HpCDF	72.1			
1,2,3,4,7,8,9-HpCDF	5.63			
OCDF	187			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	94.9	40 - 135	
	13C-1,2,3,7,8-PeCDD	98.6	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	80.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	82.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	80.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	85.6	40 - 135	
	13C-OCDD	95.4	40 - 135	
	13C-2,3,7,8-TCDF	91.3	40 - 135	
	13C-1,2,3,7,8-PeCDF	106	40 - 135	
	13C-2,3,4,7,8-PeCDF	104	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	89.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	93.4	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	89.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	87.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	85.0	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	85.0	40 - 135	
	13C-OCDF	89.3	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	96.5	40 - 135	

Totals			
Total TCDD	33.7		
Total PeCDD	45.9		
Total HxCDD	124		
Total HpCDD	648		
Total TCDF	104	105	
Total PeCDF	94.8		J
Total HxCDF	106		
Total HpCDF	187		

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 17.5

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 30-Aug-2012 14:46

Sample ID: DUP-2 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-012	Date Received:	10-Aug-12
Project:		Sample Size:	12.9 g	QC Batch No.:	4618	Date Extracted:	15-Aug-12
Date Collected:	8-Aug-12	%Solids:	78.0	Date Analyzed DB-5:	21-Aug-12	Dates Analyzed DB-225:	21-Aug-12
Time Collected:	0000						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	3.75			
1,2,3,7,8-PeCDD	96.8			
1,2,3,4,7,8-HxCDD	280			
1,2,3,6,7,8-HxCDD	1220			
1,2,3,7,8,9-HxCDD	632			
1,2,3,4,6,7,8-HpCDD	28600			E J
OCDD	240000			D,E J
2,3,7,8-TCDF	5.09			
1,2,3,7,8-PeCDF	22.9			
2,3,4,7,8-PeCDF	81.9			
1,2,3,4,7,8-HxCDF	242			
1,2,3,6,7,8-HxCDF	142			
2,3,4,6,7,8-HxCDF	248			
1,2,3,7,8,9-HxCDF	32.4			
1,2,3,4,6,7,8-HpCDF	5810			E J
1,2,3,4,7,8,9-HpCDF	423			
OCDF	28400			E J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	95.4	40 - 135	
	13C-1,2,3,7,8-PeCDD	96.8	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	83.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	88.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	82.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	112	40 - 135	
	13C-OCDD	106	40 - 135	D
	13C-2,3,7,8-TCDF	92.2	40 - 135	
	13C-1,2,3,7,8-PeCDF	107	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	93.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	96.5	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	91.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	88.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	101	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	91.3	40 - 135	
	13C-OCDF	130	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	98.4	40 - 135	

Totals				
Total TCDD	140			
Total PeCDD	543			
Total HxCDD	6060			
Total HpCDD	47300			J
Total TCDF	132	133		
Total PeCDF	1080			
Total HxCDF	6790			
Total HpCDF	21900			J

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 835

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: FEB

Approved By: Rose Harrelson 30-Aug-2012 16:16

Sample ID: A1-56 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-002	Date Received:	10-Aug-12
Project:		Sample Size:	12.5 g	QC Batch No.:	4629	Date Extracted:	22-Aug-12
Date Collected:	8-Aug-12	%Solids:	80.8	Date Analyzed DB-5:	29-Aug-12	Date Analyzed DB-225:	NA
Time Collected:	0820						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.699			
1,2,3,7,8-PeCDD	2.44			J
1,2,3,4,7,8-HxCDD	5.63			
1,2,3,6,7,8-HxCDD	13.3			
1,2,3,7,8,9-HxCDD	10.4			
1,2,3,4,6,7,8-HpCDD	541			
OCDD	14800			B,E J
2,3,7,8-TCDF	ND	0.362		
1,2,3,7,8-PeCDF	ND		0.370	UX
2,3,4,7,8-PeCDF	1.07			J
1,2,3,4,7,8-HxCDF	4.09			
1,2,3,6,7,8-HxCDF	1.48			J
2,3,4,6,7,8-HxCDF	2.35			J
1,2,3,7,8,9-HxCDF	0.296			J
1,2,3,4,6,7,8-HpCDF	61.3			
1,2,3,4,7,8,9-HpCDF	5.43			
OCDF	327			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	92.4	40 - 135	
	13C-1,2,3,7,8-PeCDD	100	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	77.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	87.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	81.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	84.8	40 - 135	
	13C-OCDD	95.5	40 - 135	
	13C-2,3,7,8-TCDF	92.4	40 - 135	
	13C-1,2,3,7,8-PeCDF	107	40 - 135	
	13C-2,3,4,7,8-PeCDF	108	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	87.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	95.0	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	91.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	90.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	91.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	91.5	40 - 135	
	13C-OCDF	93.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	97.3	40 - 135	

Totals	
Total TCDD	6.86
Total PeCDD	20.9
Total HxCDD	146
Total HpCDD	1160
Total TCDF	3.48
Total PeCDF	11.4
Total HxCDF	71.7
Total HpCDF	250

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 17.8

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: ANP

Approved By: Calvin Tanaka 30-Aug-2012 14:46

Sample ID: A1-63 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33932-004	Date Received:	10-Aug-12
Project:		Sample Size:	12.8 g	QC Batch No.:	4629	Date Extracted:	22-Aug-12
Date Collected:	8-Aug-12	%Solids:	80.4	Date Analyzed DB-5:	29-Aug-12	Date Analyzed DB-225:	NA
Time Collected:	0845						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND		0.478	U X
1,2,3,7,8-PeCDD	2.33			J
1,2,3,4,7,8-HxCDD	4.72			
1,2,3,6,7,8-HxCDD	10.8			
1,2,3,7,8,9-HxCDD	9.23			
1,2,3,4,6,7,8-HpCDD	446			
OCDD	14900			B,E J
2,3,7,8-TCDF	ND	0.233		
1,2,3,7,8-PeCDF	ND		0.281	U X
2,3,4,7,8-PeCDF	0.772			J
1,2,3,4,7,8-HxCDF	3.11			
1,2,3,6,7,8-HxCDF	1.22			J
2,3,4,6,7,8-HxCDF	1.75			J
1,2,3,7,8,9-HxCDF	0.340			J
1,2,3,4,6,7,8-HpCDF	40.1			
1,2,3,4,7,8,9-HpCDF	3.59			
OCDF	193			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	93.8	40 - 135	
	13C-1,2,3,7,8-PeCDD	99.0	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	78.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	87.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	80.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	85.5	40 - 135	
	13C-OCDD	94.1	40 - 135	
	13C-2,3,7,8-TCDF	93.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	109	40 - 135	
	13C-2,3,4,7,8-PeCDF	106	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	87.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	93.1	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	90.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	88.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	90.9	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	88.8	40 - 135	
	13C-OCDF	94.3	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	95.0	40 - 135	

Totals		
Total TCDD	4.72	5.20
Total PeCDD	18.8	
Total HxCDD	123	
Total HpCDD	966	
Total TCDF	3.18	3.60
Total PeCDF	9.15	9.56
Total HxCDF	48.2	48.4
Total HpCDF	153	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 15.1

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: ANP

Approved By: Calvin Tanaka 30-Aug-2012 14:46

Sample ID: EB 8/8/12 — **EPA Method 8290**

Client Data
Name: ARCADIS
Project:
Date Collected: 8-Aug-12
Time Collected: 0000

Sample Data
Matrix: Aqueous
Sample Size: 0.907 L

Laboratory Data
Lab Sample: 33932-013 — Date Received: 10-Aug-12
QC Batch No.: 4616 — Date Extracted: 15-Aug-12
Date Analyzed DB-5: 17-Aug-12 — Date Analyzed DB-225: NA

Analyte	Conc. (pg/L)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	ND	0.638		
1,2,3,7,8-PeCDD	ND	0.655		
1,2,3,4,7,8-HxCDD	ND	0.778		
1,2,3,6,7,8-HxCDD	ND	0.875		
1,2,3,7,8,9-HxCDD	ND	0.910		
1,2,3,4,6,7,8-HpCDD	ND	0.892		
OCDD	ND	0.914		
2,3,7,8-TCDF	ND	0.645		
1,2,3,7,8-PeCDF	ND	0.350		
2,3,4,7,8-PeCDF	ND	0.433		
1,2,3,4,7,8-HxCDF	ND	0.384		
1,2,3,6,7,8-HxCDF	ND	0.358		
2,3,4,6,7,8-HxCDF	ND	0.390		
1,2,3,7,8,9-HxCDF	ND	0.561		
1,2,3,4,6,7,8-HpCDF	ND	0.355		
1,2,3,4,7,8,9-HpCDF	ND	0.461		
OCDF	ND	1.06		

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	85.8	40 - 135	
	13C-1,2,3,7,8-PeCDD	82.3	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	72.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	72.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	70.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	72.2	40 - 135	
	13C-OCDD	65.8	40 - 135	
	13C-2,3,7,8-TCDF	85.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	102	40 - 135	
	13C-2,3,4,7,8-PeCDF	87.6	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	78.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	81.2	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	82.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	76.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	68.5	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	70.4	40 - 135	
	13C-OCDF	68.9	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	98.9	40 - 135	

Totals		
Total TCDD	ND	0.638
Total PeCDD	ND	0.655
Total HxCDD	ND	0.910
Total HpCDD	ND	0.892
Total TCDF	ND	0.645
Total PeCDF	ND	0.433
Total HxCDF	ND	0.561
Total HpCDF	ND	0.461

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 0

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

Analyst: FEB

Approved By: Calvin Tanaka 21-Aug-2012 13:25

Vista

CHAIN OF CUSTODY

FOR LABORATORY USE ONLY
Laboratory Project ID: 33932 Storage Secured: Yes ☑ No ☐
Storage ID: WR-8 Temp: 1.3 °C

TAT: (Check One): 2.1°C
Standard: ☒ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:

Project I.D.: _____ P.O.# B0039212.0000.00002 Sampler: C. McKendrick (Name) T. STEWART

Invoice to: Name: DAVID BESSINGPASS Company: ARCADIS Address: 4350 EXCELSIOR BLVD City: BAXTER State: MN Zip: 56425 Ph#: 218-829-4167 Fax#:

Relinquished by: (Signature and Printed Name) Claire McKendrick Date: 8/9/12 Time: 1600 Received by: (Signature and Printed Name) Christina Benedict Date: 8/10/12 Time: 0814

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: _____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1614 PBDE	CARB429 PAH	CARB429 WHO-29
* A1-02	8/8/12	0805		1	G	SD						X									
* A1-50	8/8/12	0820		1	G	SD						X									
* A1-57	8/8/12	0830		1	G	SD						X									
* A1-03	8/8/12	0845		1	G	SD						X									
* A1-52	8/9/12	0920		1	G	SD						X									
* A1-53	8/9/12	0935		1	G	SD						X									
* A1-59	8/9/12	0955		1	G	SD						X									
* A1-54	8/9/12	1040		1	G	SD						X									
* A1-55	8/9/12	1115		1	G	SD						X									
* A1-01	8/8/12	1140		1	G	SD						X									

Special Instructions/Comments:
* project 33932
* 8 project 33933
8/10/12

SEND DOCUMENTATION AND RESULTS TO:

Name: DAVID BESSINGPASS
Company: ARCADIS
Address: _____
City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____
Email: DAVID.BESSINGPASS@ARCADIS-US.COM

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other_____

Vista CHAIN OF CUSTODY

FOR LABORATORY USE ONLY Storage Secured

Laboratory Project ID: 33932 Yes ☐ No ☐

Storage ID: WR-2 Temp 1.2°/2.1°C

TAT: (Check One):
Standard: X 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:

Project I.D.: _____ P.O.# B00392102.0000.00002 Sampler: J. STEWART & C. MCKENDRICK (Name)

Invoice to: Name: DAVID BESSINGPASS Company: ARCADIS Address: 10002 EXCELSIOR RD City: BAXTER State: MN Zip: 56425 Ph#: 218-829-4007 Fax#:

Relinquished by: (Signature and Printed Name) Chris McKendrick Date: 8/9/12 Time: 1600 Received by: (Signature and Printed Name) Donna J. Benedict / B. Benedict Date: 8/10/12 Time: 0841

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: _____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

	Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1614 PBDE	CARB429 PAH	CARB429 WHO-29
*	AI-100	8/8/12	1530		2	G	SO						X										
*	A3-32	8/8/12	1440		1	G	SO						X										
*	A3-29	8/8/12	1500		1	G	SO						X										
*	DUP-1	8/8/12	-		1	G	SO						X										
*	DUP-2	8/8/12	-		1	G	SO						X										
*	MS/MSD 1	8/8/12	-		2	G	SO						X										
*	MS/MSD 2	8/8/12	-		2	G	SO						X										
*	EB	8/8/12	-		2	A	W						X										
*	A3-34	8/9/12	0900		1	G	SO						X										
*	A3-33	8/9/12	0915		1	G	SO						X										

Special Instructions/Comments:
* project 33932
* project 33933

SEND DOCUMENTATION AND RESULTS TO:

Name: DAVID BESSINGPASS
Company: ARCADIS
Address: 10002 EXCELSIOR RD
City: BAXTER State: MN Zip: 56425
Phone: 218-829-4007 Fax: _____
Email: DAVID.BESSINGPASS@ARCADIS-US.COM

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other _____

*Bottle Preservative Type: T = Thiosulfate,
O = Other _____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other _____

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

ARCADIS
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Beazer East Inc.

Former Koppers Wood-Treating Site

Data Review

CARBONDALE, ILLINOIS

Dioxins/Furans Analyses

SDG # 33933

Analyses Performed By:
Vista Analytical Laboratories
El Dorado Hills, California

Report #17381
Review Level: Tier III
Project: B0039262.0000.00003

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 33933 for samples collected in association with the Beazer East Inc. Former Koppers Wood-Treating Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis
					Dioxins/Furans
A1-50	33933-001	Soil	8/9/2012		X
A1-51	33933-002	Soil	8/9/2012		X
A3-28	33933-003	Soil	8/9/2012		X
A3-27	33933-004	Soil	8/9/2012		X
A3-26	33933-005	Soil	8/9/2012		X
A3-25	33933-006	Soil	8/9/2012		X
A3-31	33933-007	Soil	8/9/2012		X
A3-30	33933-008	Soil	8/9/2012		X
A1-58	33933-009	Soil	8/9/2012		X
DUP-3	33933-010	Soil	8/9/2012	A1-50	X
A3-32	33933-011	Soil	8/8/2012		X
A3-29	33933-012	Soil	8/8/2012		X
A3-34	33933-013	Soil	8/9/2012		X
A3-33	33933-014	Soil	8/9/2012		X
A1-61	33933-015	Soil	8/8/2012		X
EB 8/9/12	33933-016	Water	8/9/2012		X

1. The matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location A1-61.
2. Sample results were reported on a dry-weight basis.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8290. Data were reviewed in accordance with USEPA National Functional Guidelines of January 2005.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected as unusable. The analyte may or may not be present in the sample.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

POLYCHLORINATED DIBENZODIOXINS AND POLYCHLORINATED DIBENZOFURANS (PCDD/PCDF) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8290	Water	30 days from collection to extraction and 45 days from extraction to analysis	Cooled @ 4±2 °C
	Soil	30 days from collection to extraction and 45 days from extraction to analysis	Cooled @ 4±2 °C

The samples were received at the laboratory at acceptable temperatures and all samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment rinse blanks also measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in an associated method blank and equipment blank (which were analyzed with SDG 33933); however, the associated sample results were either greater than the BAL or non-detect. Therefore, qualification of the sample results was not required.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable; system performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

A maximum relative standard deviation (RSD) of 20% is allowed for all non-labeled compounds (target) and 30% is allowed for all labeled compounds (internal standards and recovery standards)

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibited percent difference (%D) less than the control limit (20%).

All initial and continuing calibration criteria were within the control limits.

5. Internal Standard Performance

All samples to be analyzed for PCDD/PCDF compounds are spiked with internal standards prior to extraction. Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds exhibit recoveries within the control limits of 40% to 135%.

Sample locations associated with internal standards exhibiting responses outside of the control limits are presented in the following table.

Sample Locations	Internal Standard	Response
A3-28	^{13}C-OCDD	>UL

The criteria used to evaluate the internal standard responses are presented in the following table. In the case of an internal standard deviation, the compounds quantitated under the deviant internal standard are qualified as documented in the table below.

Control limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No action
	Detect	J
< the lower control limit (LL) but > 40%	Non-detect	J
	Detect	J
< 25%	Non-detect	R
	Detect	J

6. Recovery Standard Performance

The recovery standard (^{37}Cl-2,3,7,8-TCDD) is added to the sample extract prior to the extract clean-up steps. The concentrations of the labeled standards (internal standards) are determined using the recovery standard.

All recovery standard recoveries were acceptable.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds spiked in the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent differences (RPDs) between the MS and MSD must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compounds concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
A1-61	1,2,3,4,6,7,8-HpCDF	< LL but > 10%	< LL but > 10%

AC = Acceptable

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	J
	Detect	J
< 10%	Non-detect	R
	Detect	J

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit recoveries within the laboratory-established acceptance limits.

All compounds associated with the LCS analyses exhibited recoveries within the control limits.

9. Field Duplicate Sample Analysis

Field duplicate analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 100% for soil matrices is applied to the RPD between the parent and the field duplicate samples. In the case where the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results (in ug/kg) for the field duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
A1-50 DUP-3	1,2,3,4,6,7,8-HpCDD	0.626	0.781	22.0%
	1,2,3,4,6,7,8-HpCDF	0.0588	0.0491	17.9%
	1,2,3,4,7,8,9-HpCDF	0.00482	0.00424	12.8%
	1,2,3,4,7,8-HxCDD	0.00408	0.00513	22.8%
	1,2,3,4,7,8-HxCDF	0.00377	0.00334	12.0%
	1,2,3,6,7,8-HxCDD	0.0158	0.0145	8.5%
	1,2,3,6,7,8-HxCDF	0.00225 J	0.00161 J	33.1%
	1,2,3,7,8,9-HxCDD	0.0117	0.0118	0.8%
	1,2,3,7,8,9-HxCDF	0.000545 J	0.000345 J	44.9%
	1,2,3,7,8-PeCDD	0.00251	0.0019 J	27.6%
	1,2,3,7,8-PeCDF	0.000752 J	0.000465 J	47.1%
	2,3,4,6,7,8-HxCDF	0.00394	0.00325	19.1%
	2,3,4,7,8-PeCDF	0.00138 J	0.00138 J	0%
	2,3,7,8-TCDD	0.000558	0.000416 J	29.1%
	2,3,7,8-TCDF	0.000633	0.000436 J	36.8%
	37Cl-2,3,7,8-TCDD	0.0746	0.0822	9.6%
	OCDD	21.1	23.9	12.4%
	OCDF	0.421	0.351	18.1%
	TEQ(Min)	0.0211	0.0224	5.9%
	Total HpCDD	1.47	2.46	50.3%
	Total HpCDF	0.295	0.24	20.5%
	Total HxCDD	0.164	0.235	35.5%
	Total HxCDF	0.0909	0.0777	15.6%
	Total PeCDD	0.0227	0.0203	11.1%
	Total PeCDF	0.0504	0.0339	39.1%
	Total TCDD	0.0126	0.0104	19.1%
	Total TCDF	0.018	0.0135	28.5%
	WHO Dioxin TEQ(Human/Mammal-NDs Excluded)	0.0211	0.0224	5.9%
	WHO Dioxin TEQ(Human/Mammal-NDs used at 1/2 DL)	0.0211	0.0224	5.9%

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. Compound Identification

PCDD/PCDF compounds are identified by using the compound's ion abundance ratios, signal-to-noise ratios, and retention times relative to the internal standards'.

An estimated maximum possible concentration (EMPC) designation is given to compounds which have signals eluting within the established retention time window which would, if positively identified, be greater than the detection limit. The signals do not, however, meet the ion abundance ratio criteria and therefore cannot be identified as the compound of interest. The EMPC value is the estimated concentration of the interferant quantitated "as the compound of interest". This value should be considered an elevated detection limit based on potential compound identification and quantitation interference. The "UX" qualifier has been added to the following sample results (in ug/kg) to indicate the elevated detection limit as EMPC.

Sample ID	Compound	Laboratory Result	Reported Result
A3-29	2,3,7,8-TCDD	0.000225 EMPC	0.000225 UX
A3-25	2,3,7,8-TCDF	0.000233 EMPC	0.000233 UX
	2,3,4,7,8-PeCDF	0.000519 EMPC	0.000519 UX
	1,2,3,7,8,9-HxCDF	0.000317 EMPC	0.000317 UX

The following results exhibited evidence of interference by chlorodiphenyl ethers. The results were flagged "P" by the laboratory indicating the result is the maximum concentrations of the analytes in the case that all of the quantified area is due to the target analyte and none due to the interference. Therefore, these results have been qualified as estimated ("J").

Sample ID	Compound
A1-51	Total PeCDF
A3-28	1,2,3,6,7,8-HxCDF Total TCDF Total PeCDF Total HxCDF
A3-34	Total PeCDF

Sample results that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table (ug/kg).

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
A1-50	OCDD	21.1 E	—	21.1 EJ
A1-51	OCDD	24.5 E	—	24.5 EJ
A3-28	1,2,3,6,7,8-HxCDD	6.66 E	—	6.66 EJ
	1,2,3,7,8,9-HxCDD	3.02 E	—	3.02 EJ
	1,2,3,4,6,7,8-HpCDD	343 ED	—	343 EDJ
	OCDD	2270 ED	—	2270 EDJ
	1,2,3,4,6,7,8-HpCDF	68.9 ED	—	68.9 EDJ
	OCDF	438 ED	—	438 EDJ
A3-27	OCDD	13.6 E	—	13.6 EJ
A3-26	1,2,3,4,6,7,8-HpCDD	5 E	—	5 EJ
	OCDF	4.62 E	—	4.62 EJ
A3-31	OCDD	22.5 E	—	22.5 EJ
A3-30	OCDD	29.4 E	—	29.4 EJ

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
A1-58	OCDD	31.3 E	—	31.3 EJ
DUP-3	OCDD	23.9 E	—	23.9 EJ
A3-32	1,2,3,4,6,7,8-HpCDD	23.9 ED	—	23.9 EDJ
	1,2,3,4,6,7,8-HpCDF	5.5 E	—	5.5 EJ
	OCDF	27.3 E	—	27.3 EJ
A3-29	OCDD	7.77 E	—	7.77 EJ
A3-34	1,2,3,4,6,7,8-HpCDD	5.16 E	—	5.16 EJ
	OCDD	45.8 E	—	45.8 EJ
	OCDF	4.24 E	—	4.24 EJ
A3-33	1,2,3,4,6,7,8-HpCDD	43.1 ED	—	43.1 EDJ
	OCDD	487 ED	—	487 EDJ
	OCDF	41.5 ED	—	41.5 EDJ
A3-25	OCDD	34.4 E	—	34.4 EJ
A1-61	1,2,3,4,6,7,8-HpCDD	3.12 E	—	3.12 EJ
	OCDD	38.6 E	—	38.6 EJ

Note: In the instance where both the original analysis and the diluted analysis sample results exhibited a concentration greater than and/or less than the calibration linear range of the instrument; the sample result exhibiting the greatest concentration will be reported as the final result.

Sample results associated with compounds exhibiting concentration greater than the linear range qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range	D
Diluted sample result less than the calibration range	DJ
Diluted sample result greater than the calibration range	EDJ
Original sample result greater than the calibration range	EJ

11. System Performance and Overall Assessment

Please note that when individual compounds are qualified as estimated (J) during validation, this qualification is applied to the totals as well.

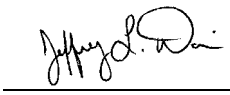
Overall system performance was acceptable. Except for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PCDD/PCDF

PCDDs/PCDFs; SW-846 8290	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X		X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X	
Laboratory Control Sample Duplicate (LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD RPD		X		X	
Field/Laboratory Duplicate Sample RPD		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Signal-to-noise ratio $\geq$ 10:1		X		X	
Internal standard performance		X	X		
Recovery standard performance		X		X	
Resolution mix $\leq$ 25%		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

RSD – relative standard deviation
%R - percent recovery
RPD - relative percent difference
%D – difference

VALIDATION PERFORMED BY: Jeffrey L. Davin

SIGNATURE: 

DATE: September 27, 2012

PEER REVIEW: Dennis Capria

DATE: October 1, 2012

CHAIN OF CUSTODY /
CORRECTED SAMPLE ANALYSIS DATA SHEETS

Sample ID: A1-50 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-001	Date Received:	10-Aug-12
Project:		Sample Size:	12.7 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	79.9	Date Analyzed DB-5:	29-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	0930						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.558			
1,2,3,7,8-PeCDD	2.51			
1,2,3,4,7,8-HxCDD	4.08			
1,2,3,6,7,8-HxCDD	15.8			
1,2,3,7,8,9-HxCDD	11.7			
1,2,3,4,6,7,8-HpCDD	626			
OCDD	21100			B,E J
2,3,7,8-TCDF	0.633			
1,2,3,7,8-PeCDF	0.752			J
2,3,4,7,8-PeCDF	1.38			J
1,2,3,4,7,8-HxCDF	3.77			
1,2,3,6,7,8-HxCDF	2.25			J
2,3,4,6,7,8-HxCDF	3.94			
1,2,3,7,8,9-HxCDF	0.545			J
1,2,3,4,6,7,8-HpCDF	58.8			
1,2,3,4,7,8,9-HpCDF	4.82			
OCDF	421			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	91.6	40 - 135	
	13C-1,2,3,7,8-PeCDD	95.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	89.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	82.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	84.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	94.1	40 - 135	
	13C-OCDD	97.3	40 - 135	
	13C-2,3,7,8-TCDF	92.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	91.9	40 - 135	
	13C-2,3,4,7,8-PeCDF	88.5	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	89.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	83.8	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	87.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	82.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	90.2	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	90.9	40 - 135	
	13C-OCDF	87.3	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	94.5	40 - 135	

Totals		
Total TCDD	12.6	
Total PeCDD	22.7	
Total HxCDD	164	
Total HpCDD	1470	
Total TCDF	18.0	19.2
Total PeCDF	50.4	
Total HxCDF	90.9	
Total HpCDF	295	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 21.1

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: A1-51 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-002	Date Received:	10-Aug-12
Project:		Sample Size:	12.9 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	78.0	Date Analyzed DB-5:	29-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	0945						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	1.62			
1,2,3,7,8-PeCDD	5.97			
1,2,3,4,7,8-HxCDD	11.4			
1,2,3,6,7,8-HxCDD	31.1			
1,2,3,7,8,9-HxCDD	25.7			
1,2,3,4,6,7,8-HpCDD	918			
OCDD	24500			B,E J
2,3,7,8-TCDF	1.84			
1,2,3,7,8-PeCDF	1.60			J
2,3,4,7,8-PeCDF	3.57			
1,2,3,4,7,8-HxCDF	8.89			
1,2,3,6,7,8-HxCDF	7.75			
2,3,4,6,7,8-HxCDF	13.5			
1,2,3,7,8,9-HxCDF	0.793			J
1,2,3,4,6,7,8-HpCDF	136			
1,2,3,4,7,8,9-HpCDF	10.7			
OCDF	523			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	92.8	40 - 135	
	13C-1,2,3,7,8-PeCDD	104	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	83.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	83.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	81.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	95.4	40 - 135	
	13C-OCDD	107	40 - 135	
	13C-2,3,7,8-TCDF	91.4	40 - 135	
	13C-1,2,3,7,8-PeCDF	96.6	40 - 135	
	13C-2,3,4,7,8-PeCDF	90.7	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	92.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	84.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	88.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	85.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	90.4	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	94.3	40 - 135	
	13C-OCDF	92.1	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	97.1	40 - 135	

Totals			
Total TCDD	15.3	16.2	
Total PeCDD	46.0		
Total HxCDD	254		
Total HpCDD	1810		
Total TCDF	57.6	58.7	
Total PeCDF	168		P J
Total HxCDF	253		
Total HpCDF	483		

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 37.0

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: A3-28 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-003	Date Received:	10-Aug-12
Project:		Sample Size:	12.7 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	79.5	Date Analyzed DB-5:	30-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	1040						

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	38.8			
1,2,3,7,8-PeCDD	616			
1,2,3,4,7,8-HxCDD	1820			
1,2,3,6,7,8-HxCDD	6660			E J
1,2,3,7,8,9-HxCDD	3020			E J
1,2,3,4,6,7,8-HpCDD	343000			D,E J
OCDD	2270000			D,E J
2,3,7,8-TCDF	9.31			B
1,2,3,7,8-PeCDF	66.7			
2,3,4,7,8-PeCDF	110			
1,2,3,4,7,8-HxCDF	1840			
1,2,3,6,7,8-HxCDF	980			P J
2,3,4,6,7,8-HxCDF	1840			
1,2,3,7,8,9-HxCDF	125			
1,2,3,4,6,7,8-HpCDF	68900			D,E J
1,2,3,4,7,8,9-HpCDF	6060			D
OCDF	438000			D,E J

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	94.6	40 - 135	
	13C-1,2,3,7,8-PeCDD	92.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	93.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	92.7	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	66.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	78.2	40 - 135	D
	13C-OCDD	136	40 - 135	D,H
	13C-2,3,7,8-TCDF	77.4	40 - 135	
	13C-1,2,3,7,8-PeCDF	83.9	40 - 135	
	13C-2,3,4,7,8-PeCDF	81.5	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	89.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	91.2	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	90.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	104	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	84.4	40 - 135	D
	13C-1,2,3,4,7,8,9-HpCDF	81.6	40 - 135	D
	13C-OCDF	90.3	40 - 135	D
CRS	37Cl-2,3,7,8-TCDD	96.6	40 - 135	

Totals				
Total TCDD	332			
Total PeCDD	3780			
Total HxCDD	55300			
Total HpCDD	732000			
Total TCDF	450		451	P J
Total PeCDF	5450			P J
Total HxCDF	72800			P J
Total HpCDF	337000			

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 7310

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Rose Harrelson 31-Aug-2012 16:32

Sample ID: A3-27 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-004	Date Received:	10-Aug-12
Project:		Sample Size:	12.2 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	82.2	Date Analyzed DB-5:	29-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	1050						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.808			
1,2,3,7,8-PeCDD	4.66			
1,2,3,4,7,8-HxCDD	6.90			
1,2,3,6,7,8-HxCDD	17.9			
1,2,3,7,8,9-HxCDD	11.0			
1,2,3,4,6,7,8-HpCDD	532			
OCDD	13600			B,E J
2,3,7,8-TCDF	1.81			
1,2,3,7,8-PeCDF	1.72			J
2,3,4,7,8-PeCDF	3.68			
1,2,3,4,7,8-HxCDF	7.01			
1,2,3,6,7,8-HxCDF	4.20			
2,3,4,6,7,8-HxCDF	6.08			
1,2,3,7,8,9-HxCDF	0.638			J
1,2,3,4,6,7,8-HpCDF	69.2			
1,2,3,4,7,8,9-HpCDF	5.37			
OCDF	327			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	86.3	40 - 135	
	13C-1,2,3,7,8-PeCDD	93.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	83.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	77.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	79.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	90.7	40 - 135	
	13C-OCDD	90.9	40 - 135	
	13C-2,3,7,8-TCDF	85.3	40 - 135	
	13C-1,2,3,7,8-PeCDF	86.0	40 - 135	
	13C-2,3,4,7,8-PeCDF	79.3	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	86.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	82.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	80.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	81.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	88.6	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	88.9	40 - 135	
	13C-OCDF	86.2	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	93.5	40 - 135	

Totals			
Total TCDD	79.3		
Total PeCDD	87.3		
Total HxCDD	177		
Total HpCDD	1120		
Total TCDF	45.6	46.1	
Total PeCDF	70.7	70.9	
Total HxCDF	119		
Total HpCDF	268		

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 22.4

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: A3-26 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-005	Date Received:	10-Aug-12
Project:		Sample Size:	14.2 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	70.4	Date Analyzed DB-5:	30-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	1055						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	3.72			
1,2,3,7,8-PeCDD	17.5			
1,2,3,4,7,8-HxCDD	39.0			
1,2,3,6,7,8-HxCDD	160			
1,2,3,7,8,9-HxCDD	86.1			
1,2,3,4,6,7,8-HpCDD	5000			E J
OCDD	84000			D
2,3,7,8-TCDF	3.69			B
1,2,3,7,8-PeCDF	4.30			
2,3,4,7,8-PeCDF	13.0			
1,2,3,4,7,8-HxCDF	47.6			
1,2,3,6,7,8-HxCDF	25.5			
2,3,4,6,7,8-HxCDF	49.0			
1,2,3,7,8,9-HxCDF	9.97			
1,2,3,4,6,7,8-HpCDF	864			
1,2,3,4,7,8,9-HpCDF	69.7			
OCDF	4620			E J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	92.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	94.0	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	90.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	86.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	87.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	102	40 - 135	
	13C-OCDD	82.9	40 - 135	D
	13C-2,3,7,8-TCDF	90.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	99.2	40 - 135	
	13C-2,3,4,7,8-PeCDF	94.1	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	90.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	82.7	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	85.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	86.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	92.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	95.0	40 - 135	
	13C-OCDF	96.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	93.7	40 - 135	

Totals		
Total TCDD	27.2	27.9
Total PeCDD	112	
Total HxCDD	914	
Total HpCDD	9000	
Total TCDF	101	103
Total PeCDF	367	
Total HxCDF	1140	
Total HpCDF	3710	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 153

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Rose Harrelson 31-Aug-2012 16:32

Sample ID: A3-31 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-007	Date Received:	10-Aug-12
Project:		Sample Size:	13.3 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	75.7	Date Analyzed DB-5:	29-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	1150						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	1.35			
1,2,3,7,8-PeCDD	12.3			
1,2,3,4,7,8-HxCDD	19.8			
1,2,3,6,7,8-HxCDD	58.5			
1,2,3,7,8,9-HxCDD	47.5			
1,2,3,4,6,7,8-HpCDD	1460			
OCDD	22500			B,EJ
2,3,7,8-TCDF	0.810			
1,2,3,7,8-PeCDF	0.973			J
2,3,4,7,8-PeCDF	1.61			J
1,2,3,4,7,8-HxCDF	7.48			
1,2,3,6,7,8-HxCDF	3.86			
2,3,4,6,7,8-HxCDF	5.68			
1,2,3,7,8,9-HxCDF	0.771			J
1,2,3,4,6,7,8-HpCDF	140			
1,2,3,4,7,8,9-HpCDF	9.94			
OCDF	803			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	89.8	40 - 135	
	13C-1,2,3,7,8-PeCDD	96.0	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	79.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	74.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	73.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	89.2	40 - 135	
	13C-OCDD	93.8	40 - 135	
	13C-2,3,7,8-TCDF	86.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	85.3	40 - 135	
	13C-2,3,4,7,8-PeCDF	82.8	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	83.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	77.8	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	80.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	78.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	85.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	86.4	40 - 135	
	13C-OCDF	83.9	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	95.8	40 - 135	

Totals		
Total TCDD	22.7	
Total PeCDD	121	
Total HxCDD	646	
Total HpCDD	3040	
Total TCDF	13.3	13.9
Total PeCDF	30.6	30.8
Total HxCDF	155	
Total HpCDF	582	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 51.7

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: A3-30 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-008	Date Received:	10-Aug-12
Project:		Sample Size:	11.9 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	83.9	Date Analyzed DB-5:	29-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	1200						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.341			J
1,2,3,7,8-PeCDD	2.28			J
1,2,3,4,7,8-HxCDD	5.92			
1,2,3,6,7,8-HxCDD	13.1			
1,2,3,7,8,9-HxCDD	12.1			
1,2,3,4,6,7,8-HpCDD	606			
OCDD	29400			B,E J
2,3,7,8-TCDF	0.311			J
1,2,3,7,8-PeCDF	0.400			J
2,3,4,7,8-PeCDF	1.23			J
1,2,3,4,7,8-HxCDF	3.65			
1,2,3,6,7,8-HxCDF	1.65			J
2,3,4,6,7,8-HxCDF	2.54			
1,2,3,7,8,9-HxCDF	0.270			J
1,2,3,4,6,7,8-HpCDF	45.0			
1,2,3,4,7,8,9-HpCDF	3.52			
OCDF	219			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	87.6	40 - 135	
	13C-1,2,3,7,8-PeCDD	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	79.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	74.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	78.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	89.9	40 - 135	
	13C-OCDD	97.7	40 - 135	
	13C-2,3,7,8-TCDF	87.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	89.8	40 - 135	
	13C-2,3,4,7,8-PeCDF	81.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	87.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	80.2	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	82.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	81.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	85.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	89.7	40 - 135	
	13C-OCDF	86.1	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	94.6	40 - 135	

Totals		
Total TCDD	8.37	8.92
Total PeCDD	25.4	
Total HxCDD	176	
Total HpCDD	1490	
Total TCDF	6.21	6.72
Total PeCDF	12.4	12.4
Total HxCDF	60.0	
Total HpCDF	180	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 22.4

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: A1-58 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-009	Date Received:	10-Aug-12
Project:		Sample Size:	12.5 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	81.8	Date Analyzed DB-5:	29-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	1330						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.587			
1,2,3,7,8-PeCDD	2.61			
1,2,3,4,7,8-HxCDD	5.68			
1,2,3,6,7,8-HxCDD	14.0			
1,2,3,7,8,9-HxCDD	11.3			
1,2,3,4,6,7,8-HpCDD	602			
OCDD	31300			B,E J
2,3,7,8-TCDF	1.08			
1,2,3,7,8-PeCDF	0.889			J
2,3,4,7,8-PeCDF	3.66			
1,2,3,4,7,8-HxCDF	4.29			
1,2,3,6,7,8-HxCDF	2.91			
2,3,4,6,7,8-HxCDF	5.22			
1,2,3,7,8,9-HxCDF	0.638			J
1,2,3,4,6,7,8-HpCDF	83.9			
1,2,3,4,7,8,9-HpCDF	4.15			
OCDF	233			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	93.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	109	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	80.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	81.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	79.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	93.5	40 - 135	
	13C-OCDD	100	40 - 135	
	13C-2,3,7,8-TCDF	94.7	40 - 135	
	13C-1,2,3,7,8-PeCDF	95.4	40 - 135	
	13C-2,3,4,7,8-PeCDF	90.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	89.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	83.3	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	86.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	86.5	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	89.3	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	95.4	40 - 135	
	13C-OCDF	86.9	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	105	40 - 135	

Totals		
Total TCDD	9.14	9.26
Total PeCDD	23.9	
Total HxCDD	142	
Total HpCDD	1310	
Total TCDF	22.9	23.6
Total PeCDF	55.6	
Total HxCDF	115	
Total HpCDF	270	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 25.2

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: DUP-3 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-010	Date Received:	10-Aug-12
Project:		Sample Size:	12.5 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	80.5	Date Analyzed DB-5:	29-Aug-12	Date Analyzed DB-225:	NA
Time Collected:	0000						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.416			J
1,2,3,7,8-PeCDD	1.90			J
1,2,3,4,7,8-HxCDD	5.13			
1,2,3,6,7,8-HxCDD	14.5			
1,2,3,7,8,9-HxCDD	11.8			
1,2,3,4,6,7,8-HpCDD	781			
OCDD	23900			B,E J
2,3,7,8-TCDF	0.436			J
1,2,3,7,8-PeCDF	0.465			J
2,3,4,7,8-PeCDF	1.38			J
1,2,3,4,7,8-HxCDF	3.34			
1,2,3,6,7,8-HxCDF	1.61			J
2,3,4,6,7,8-HxCDF	3.25			
1,2,3,7,8,9-HxCDF	0.345			J
1,2,3,4,6,7,8-HpCDF	49.1			
1,2,3,4,7,8,9-HpCDF	4.24			
OCDF	351			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	95.7	40 - 135	
	13C-1,2,3,7,8-PeCDD	112	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	81.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	83.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	85.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	97.1	40 - 135	
	13C-OCDD	107	40 - 135	
	13C-2,3,7,8-TCDF	94.7	40 - 135	
	13C-1,2,3,7,8-PeCDF	97.3	40 - 135	
	13C-2,3,4,7,8-PeCDF	89.3	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	93.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	85.1	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	90.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	88.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	92.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	96.9	40 - 135	
	13C-OCDF	92.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	104	40 - 135	

Totals		
Total TCDD	10.4	11.2
Total PeCDD	20.3	
Total HxCDD	235	
Total HpCDD	2460	
Total TCDF	13.5	14.4
Total PeCDF	33.9	
Total HxCDF	77.7	
Total HpCDF	240	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 22.4

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: A3-32 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-011	Date Received:	10-Aug-12
Project:		Sample Size:	12.9 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	8-Aug-12	%Solids:	77.6	Date Analyzed DB-5:	30-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	1440						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	3.05			
1,2,3,7,8-PeCDD	83.7			
1,2,3,4,7,8-HxCDD	233			
1,2,3,6,7,8-HxCDD	1010			
1,2,3,7,8,9-HxCDD	514			
1,2,3,4,6,7,8-HpCDD	23900			D,E J
OCDD	198000			
2,3,7,8-TCDF	4.19			B
1,2,3,7,8-PeCDF	20.9			
2,3,4,7,8-PeCDF	42.2			
1,2,3,4,7,8-HxCDF	229			
1,2,3,6,7,8-HxCDF	132			
2,3,4,6,7,8-HxCDF	240			
1,2,3,7,8,9-HxCDF	55.8			
1,2,3,4,6,7,8-HpCDF	5500			E J
1,2,3,4,7,8,9-HpCDF	379			
OCDF	27300			E J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	91.9	40 - 135	
	13C-1,2,3,7,8-PeCDD	92.3	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	95.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	91.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	91.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	113	40 - 135	
	13C-OCDD	97.9	40 - 135	D
	13C-2,3,7,8-TCDF	87.7	40 - 135	
	13C-1,2,3,7,8-PeCDF	98.7	40 - 135	
	13C-2,3,4,7,8-PeCDF	94.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	92.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	84.1	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	88.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	91.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	100	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	102	40 - 135	
	13C-OCDF	103	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	93.5	40 - 135	

Totals		
Total TCDD	104	104
Total PeCDD	448	
Total HxCDD	4770	
Total HpCDD	39300	
Total TCDF	107	
Total PeCDF	911	
Total HxCDF	6110	
Total HpCDF	20500	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 707

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: ANP

Approved By: Rose Harrelson 31-Aug-2012 16:32

Sample ID: A3-29 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-012	Date Received:	10-Aug-12
Project:		Sample Size:	12.2 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	8-Aug-12	%Solids:	83.2	Date Analyzed DB-5:	29-Aug-12	Date Analyzed DB-225:	NA
Time Collected:	1500						

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	ND		0.225	UX
1,2,3,7,8-PeCDD	1.56			J
1,2,3,4,7,8-HxCDD	3.40			
1,2,3,6,7,8-HxCDD	6.82			
1,2,3,7,8,9-HxCDD	6.66			
1,2,3,4,6,7,8-HpCDD	249			
OCDD	7770			B,EJ
2,3,7,8-TCDF	0.253			J
1,2,3,7,8-PeCDF	0.243			J
2,3,4,7,8-PeCDF	0.351			J
1,2,3,4,7,8-HxCDF	1.40			J
1,2,3,6,7,8-HxCDF	0.675			J
2,3,4,6,7,8-HxCDF	1.02			J
1,2,3,7,8,9-HxCDF	0.171			J
1,2,3,4,6,7,8-HpCDF	14.7			
1,2,3,4,7,8,9-HpCDF	1.31			J
OCDF	65.5			

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	91.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	112	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	81.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	79.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	84.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	98.3	40 - 135	
	13C-OCDD	95.7	40 - 135	
	13C-2,3,7,8-TCDF	94.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	96.5	40 - 135	
	13C-2,3,4,7,8-PeCDF	90.0	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	91.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	86.8	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	89.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	88.5	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	91.9	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	95.0	40 - 135	
	13C-OCDF	90.5	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	102	40 - 135	

Totals		
Total TCDD	6.85	8.00
Total PeCDD	16.0	16.4
Total HxCDD	92.0	
Total HpCDD	593	
Total TCDF	5.20	5.48
Total PeCDF	6.67	6.97
Total HxCDF	23.4	
Total HpCDF	58.2	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 8.71

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: A3-34 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-013	Date Received:	10-Aug-12
Project:		Sample Size:	12.6 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	80.7	Date Analyzed DB-5:	29-Aug-12	Dates Analyzed DB-225:	31-Aug-12
Time Collected:	0900						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	2.22			
1,2,3,7,8-PeCDD	18.5			
1,2,3,4,7,8-HxCDD	58.6			
1,2,3,6,7,8-HxCDD	167			
1,2,3,7,8,9-HxCDD	118			
1,2,3,4,6,7,8-HpCDD	5160			E J
OCDD	45800			B,E J
2,3,7,8-TCDF	3.52			
1,2,3,7,8-PeCDF	5.17			
2,3,4,7,8-PeCDF	16.7			
1,2,3,4,7,8-HxCDF	73.4			
1,2,3,6,7,8-HxCDF	33.5			
2,3,4,6,7,8-HxCDF	54.8			
1,2,3,7,8,9-HxCDF	5.16			
1,2,3,4,6,7,8-HpCDF	986			
1,2,3,4,7,8,9-HpCDF	76.0			
OCDF	4240			E J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	93.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	113	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	80.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	80.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	78.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	102	40 - 135	
	13C-OCDD	109	40 - 135	
	13C-2,3,7,8-TCDF	91.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	95.7	40 - 135	
	13C-2,3,4,7,8-PeCDF	92.3	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	89.0	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	84.3	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	87.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	87.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	92.0	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	95.2	40 - 135	
	13C-OCDF	93.9	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	108	40 - 135	

Totals	
Total TCDD	46.8
Total PeCDD	109
Total HxCDD	1490
Total HpCDD	13000
Total TCDF	70.1
Total PeCDF	261 P J
Total HxCDF	1410
Total HpCDF	3660

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 154

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: A3-33 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-014	Date Received:	10-Aug-12
Project:		Sample Size:	14.9 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	9-Aug-12	%Solids:	67.8	Date Analyzed DB-5:	30-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	0915						

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	3.84			
1,2,3,7,8-PeCDD	62.6			
1,2,3,4,7,8-HxCDD	199			
1,2,3,6,7,8-HxCDD	1030			
1,2,3,7,8,9-HxCDD	360			
1,2,3,4,6,7,8-HpCDD	43100			D,E J
OCDD	487000			D,E J
2,3,7,8-TCDF	4.12			~~B~~
1,2,3,7,8-PeCDF	12.3			
2,3,4,7,8-PeCDF	43.2			
1,2,3,4,7,8-HxCDF	273			
1,2,3,6,7,8-HxCDF	90.9			
2,3,4,6,7,8-HxCDF	184			
1,2,3,7,8,9-HxCDF	49.9			
1,2,3,4,6,7,8-HpCDF	7040			D
1,2,3,4,7,8,9-HpCDF	586			D
OCDF	41500			D,E J

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	92.7	40 - 135	
	13C-1,2,3,7,8-PeCDD	87.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	90.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	84.7	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	84.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	73.1	40 - 135	D
	13C-OCDD	62.8	40 - 135	D
	13C-2,3,7,8-TCDF	93.9	40 - 135	
	13C-1,2,3,7,8-PeCDF	97.1	40 - 135	
	13C-2,3,4,7,8-PeCDF	91.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	90.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	82.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	87.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	88.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	81.2	40 - 135	D
	13C-1,2,3,4,7,8,9-HpCDF	75.3	40 - 135	D
	13C-OCDF	84.3	40 - 135	D
CRS	37Cl-2,3,7,8-TCDD	96.7	40 - 135	

Totals		
Total TCDD	102	
Total PeCDD	414	
Total HxCDD	5130	
Total HpCDD	82300	
Total TCDF	97.8	
Total PeCDF	652	665
Total HxCDF	6130	
Total HpCDF	33700	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 965

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: FEB

Approved By: Rose Harrelson 31-Aug-2012 16:32

Sample ID: A1-61 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-015	Date Received:	10-Aug-12
Project:		Sample Size:	12.0 g	QC Batch No.:	4619	Date Extracted:	19-Aug-12
Date Collected:	8-Aug-12	%Solids:	83.9	Date Analyzed DB-5:	29-Aug-12	Dates Analyzed DB-225:	30-Aug-12
Time Collected:	1140						

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	3.60			
1,2,3,7,8-PeCDD	22.9			
1,2,3,4,7,8-HxCDD	52.0			
1,2,3,6,7,8-HxCDD	123			
1,2,3,7,8,9-HxCDD	80.1			
1,2,3,4,6,7,8-HpCDD	3120			E J
OCDD	38600			B,E J
2,3,7,8-TCDF	0.859			
1,2,3,7,8-PeCDF	1.94			J
2,3,4,7,8-PeCDF	3.10			
1,2,3,4,7,8-HxCDF	22.9			
1,2,3,6,7,8-HxCDF	7.72			
2,3,4,6,7,8-HxCDF	11.4			
1,2,3,7,8,9-HxCDF	2.11			J
1,2,3,4,6,7,8-HpCDF	309			J
1,2,3,4,7,8,9-HpCDF	23.4			
OCDF	2160			

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	92.9	40 - 135	
	13C-1,2,3,7,8-PeCDD	110	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	86.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	77.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	82.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	101	40 - 135	
	13C-OCDD	103	40 - 135	
	13C-2,3,7,8-TCDF	94.6	40 - 135	
	13C-1,2,3,7,8-PeCDF	88.8	40 - 135	
	13C-2,3,4,7,8-PeCDF	85.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	89.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	83.5	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	88.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	89.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	92.3	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	94.6	40 - 135	
	13C-OCDF	93.5	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	105	40 - 135	

Totals			
Total TCDD	99.1		
Total PeCDD	361		
Total HxCDD	1380		
Total HpCDD	6090		
Total TCDF	30.8	31.1	
Total PeCDF	68.1	68.4	
Total HxCDF	383		
Total HpCDF	1500		J

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 104

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: MAS

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: A3-25 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Soil	Lab Sample:	33933-006	Date Received:	10-Aug-12
Project:		Sample Size:	13.0 g	QC Batch No.:	4623	Date Extracted:	20-Aug-12
Date Collected:	9-Aug-12	%Solids:	78.5	Date Analyzed DB-5:	24-Aug-12	Date Analyzed DB-225:	NA
Time Collected:	1100						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	0.361			J
1,2,3,7,8-PeCDD	2.24			J
1,2,3,4,7,8-HxCDD	5.33			
1,2,3,6,7,8-HxCDD	14.5			
1,2,3,7,8,9-HxCDD	10.4			
1,2,3,4,6,7,8-HpCDD	715			
OCDD	34400			EJ
2,3,7,8-TCDF	ND		0.233	UX
1,2,3,7,8-PeCDF	0.402			J
2,3,4,7,8-PeCDF	ND		0.519	UX
1,2,3,4,7,8-HxCDF	2.57			
1,2,3,6,7,8-HxCDF	1.16			J
2,3,4,6,7,8-HxCDF	2.03			J
1,2,3,7,8,9-HxCDF	ND		0.317	UX
1,2,3,4,6,7,8-HpCDF	34.9			
1,2,3,4,7,8,9-HpCDF	3.51			
OCDF	147			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	93.5	40 - 135	
	13C-1,2,3,7,8-PeCDD	89.6	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	75.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	77.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	74.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	80.0	40 - 135	
	13C-OCDD	102	40 - 135	
	13C-2,3,7,8-TCDF	89.4	40 - 135	
	13C-1,2,3,7,8-PeCDF	102	40 - 135	
	13C-2,3,4,7,8-PeCDF	103	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	84.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	86.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	85.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	82.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	82.0	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	81.7	40 - 135	
	13C-OCDF	87.4	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	94.3	40 - 135	

Totals	
Total TCDD	12.7
Total PeCDD	57.9
Total HxCDD	239
Total HpCDD	2280
Total TCDF	3.02
Total PeCDF	4.94
Total HxCDF	54.1
Total HpCDF	143

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 24.1

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: FEB

Approved By: Calvin Tanaka 31-Aug-2012 14:40

Sample ID: EB 8/9/12 — **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	ARCADIS	Matrix:	Aqueous	Lab Sample:	33933-016	Date Received:	10-Aug-12
Project:		Sample Size:	0.841 L	QC Batch No.:	4616	Date Extracted:	15-Aug-12
Date Collected:	9-Aug-12			Date Analyzed DB-5:	17-Aug-12	Date Analyzed DB-225:	NA
Time Collected:	0000						

Analyte	Conc. (pg/L)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	ND	0.779		
1,2,3,7,8-PeCDD	ND	0.834		
1,2,3,4,7,8-HxCDD	ND	0.781		
1,2,3,6,7,8-HxCDD	ND	0.891		
1,2,3,7,8,9-HxCDD	ND	0.905		
1,2,3,4,6,7,8-HpCDD	ND	0.976		
OCDD	2.97			J
2,3,7,8-TCDF	ND	0.838		
1,2,3,7,8-PeCDF	ND	0.498		
2,3,4,7,8-PeCDF	ND	0.613		
1,2,3,4,7,8-HxCDF	ND	0.396		
1,2,3,6,7,8-HxCDF	ND	0.366		
2,3,4,6,7,8-HxCDF	ND	0.398		
1,2,3,7,8,9-HxCDF	ND	0.569		
1,2,3,4,6,7,8-HpCDF	ND	0.428		
1,2,3,4,7,8,9-HpCDF	ND	0.537		
OCDF	ND	1.02		

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	88.0	40 - 135	
	13C-1,2,3,7,8-PeCDD	83.1	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	77.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	78.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	76.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	76.8	40 - 135	
	13C-OCDD	67.4	40 - 135	
	13C-2,3,7,8-TCDF	86.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	106	40 - 135	
	13C-2,3,4,7,8-PeCDF	87.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	82.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	86.8	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	88.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	80.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	74.5	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	74.0	40 - 135	
	13C-OCDF	71.4	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	96.1	40 - 135	

Totals		
Total TCDD	ND	0.779
Total PeCDD	ND	0.834
Total HxCDD	ND	0.905
Total HpCDD	ND	0.976
Total TCDF	ND	0.838
Total PeCDF	ND	0.613
Total HxCDF	ND	0.569
Total HpCDF	ND	0.537

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 0.000891

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (2005) World Health Organization Toxic Equivalent Factors (WHO)

Analyst: FEB

Approved By: Calvin Tanaka 31-Aug-2012 14:40

1 of 4

CHAIN OF CUSTODY

Vista

FOR LABORATORY USE ONLY
Laboratory Project ID: 33933
Storage ID: WR2
Storage Secured: Yes ☑ No ☐
Temp ______ °C

TAT: (Check One):
Standard: ☒ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify: ____

Project I.D.: ____________ P.O.# B0039212.0000.00002 Sampler: I. STEWART & C. MCKENDRICK (Name)

Invoice to: Name: DAVID BESSINGPASS Company: ARCADIS Address: 10002 EXCELSIOR RD City: BAXTER State: MN Zip: 56425 Ph#: 218-829-4007 Fax#:

Relinquished by: (Signature and Printed Name) Claire McKendrick Date: 8/9/12 Time: 1600 Received by: (Signature and Printed Name) B. Benedict Date: 8/10/12 Time: 0842

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: ____________

Method of Shipment: ____________

Tracking No.: ____________

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCB'S	EPA1668 209 CONGENERS	EPA1614 PBDE	CARB429 PAH	WHO-29
A1-50	8/9/12	0930		1	G	SO						X									
A1-51	8/9/12	0945		1	G	SO						X									
A3-28	8/9/12	1040		1	G	SO						X									
A3-27	8/9/12	1050		1	G	SO						X									
A3-26	8/9/12	1055		1	G	SO						X									
A3-25	8/9/12	1100		1	G	SO						X									
A3-31	8/9/12	1150		1	G	SO						X									
A3-30	8/9/12	1200		1	G	SO						X									
A1-53	8/9/12	1330		1	G	SO						X									
DUP-3	8/9/12	-		1	G	SO						X									

Special Instructions/Comments: ____________

SEND DOCUMENTATION AND RESULTS TO:

Name: DAVID BESSINGPASS
Company: ARCADIS
Address: 10002 EXCELSIOR RD
City: BAXTER State: MN Zip: 56425
Phone: 218-829-4007 Fax:
Email: DAVID.BESSINGPASS@ARCADIS-US.COM

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other ________

*Bottle Preservative Type: T = Thiosulfate,
O = Other ________

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other ________

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Vista

CHAIN OF COUSTODY

FOR LABORATORY USE ONLY 2 of 4

Laboratory Project ID: 33933

Storage Secured Yes ☐ No ☐

Storage ID________ Temp _____ °C

TAT: (Check One):
Standard: ☒ 21 Days
Rush (surcharge may apply): ◯ 14 days ◯ 7 days Specify:____

Project I.D.:________ P.O.# B00392102.0000.00002 Sampler: T. STEWART & C. MCKENDRICK (Name)

Invoice to: Name: DAVID BESSINGPASS Company: ARCADIS Address: 10002 EXCELSIOR RD City: BAXTER State: MN Zip: 56425 Ph#: 218-829-4107 Fax#:

Relinquished by: (Signature and Printed Name) Claire McKendrick Date: 8/9/12 Time: 1600 Received by: (Signature and Printed Name) B. Benedict Date: 8/10/12 Time: 0841

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN:________

Method of Shipment:________

Tracking No.:________

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Container(s) Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1614 PBDE	CARB429 PAH	WHO-29
* A1-00	8/8/12	1330		2	G	SD						X									
* A3-32	8/8/12	1440		1	G	SD						X									
* A3-29	8/8/12	1500		1	G	SD						X									
* DUP-1	8/8/12	–		1	G	SD						X									
* DUP-2	8/8/12	–		1	G	SD						X									
* MS/MSD 1	8/8/12	–		2	G	SD						X									
* MS/MSD 2	8/8/12	–		2	G	SD						X									
* EB	8/8/12	–		2	A	W						X									
* A3-34	8/9/12	0900		1	G	SD						X									
* A3-33	8/9/12	0915		1	G	SD						X									

Special Instructions/Comments:
* project 33932
* project 33933

SEND DOCUMENTATION AND RESULTS TO:

Name: DAVID BESSINGPASS
Company: ARCADIS
Address: 10002 EXCELSIOR RD
City: BAXTER State: MN Zip: 56425
Phone: 218-829-4107 Fax:
Email: DAVID.BESSINGPASS@ARCADIS-US.COM

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other______

*Bottle Preservative Type: T = Thiosulfate,
O = Other______

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, AQ = Aqueous, O = Other______

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Vista

CHAIN OF COUSTODY

FOR LABORATORY USE ONLY
Laboratory Project ID: 33933
Storage Secured Yes ☐ No ☐
Storage ID ____ Temp ____ °C

TAT: (Check One):
Standard: ⊗ 21 Days
Rush (surcharge may apply):
◯ 14 days ◯ 7 days Specify:___

Project I.D.: ____ P.O.# B0039212.0000.00002 Sampler: ~~C. McKendrick~~ T. STEWART (Name)

Invoice to: Name DAVID BESSINGPASS Company ARCADIS Address 1102 EXCELSIOR RD City BAXTER State MN Zip 56425 Ph# 218-829-4107 Fax#

Relinquished by: (Signature and Printed Name) Claire McKandrick Date: 8/9/12 Time: 1600 Received by: (Signature and Printed Name) B. Benedict Date: 8/10/12 Time: 0841

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: ____

Method of Shipment: ____

Tracking No.: ____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Container(s) Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 TOTALS	EPA1668 COPLANAR PCB'S	EPA1668 209 CONGENERS	EPA1614 PBDE	CARB429 PAH	WHO-29
* A1-02	8/8/12	0805		1	G	SD						X									
* A1-56	8/8/12	0820		1	G	SD						X									
* A1-57	8/8/12	0830		1	G	SD						X									
* A1-03	8/8/12	0845		1	G	SD						X									
* A1-52	8/8/12	0920		1	G	SD						X									
* A1-53	8/8/12	0935		1	G	SD						X									
* A1-59	8/8/12	0955		1	G	SD						X									
* A1-54	8/8/12	1040		1	G	SD						X									
* A1-55	8/8/12	1115		1	G	SD						X									
* A1-01	8/8/12	1140		1	G	SD						X									

Special Instructions/Comments:
* project 33932
* project 33933

SEND DOCUMENTATION AND RESULTS TO:

Name: DAVID BESSINGPASS
Company: ARCADIS
Address: ____
City: ____ State: ____ Zip: ____
Phone: ____ Fax: ____
Email: DAVID.BESSINGPASS@ARCADIS-US.COM

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other____

*Bottle Preservative Type: T = Thiosulfate,
O = Other____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other____

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Vista

CHAIN OF CUSTODY

FOR LABORATORY USE ONLY
Laboratory Project ID: 33933
Storage ID: WR2
Storage Secured: Yes ☑ No ☐
Temp ____ °C

TAT: (Check One):
Standard: ☒ 21 Days
Rush (surcharge may apply):
◯ 14 days ◯ 7 days Specify:____

Project I.D.: ____ P.O.# B0031262.0000.00002 Sampler: I. STEWART & C. MCKENDRICK (Name)

Invoice to: Name: DAVID BESSINGPASS Company: ARCADIS Address: 6602 EXCELSIOR RD. City: BAXTER State: MN Zip: 56425 Ph#: 218-821-4607 Fax#:

Relinquished by: (Signature and Printed Name) Claire McKendrick Date: 8/9/12 Time: 1600 Received by: (Signature and Printed Name) Bettina Benedict B. Benedict Date: 8/10/12 Time: 0842

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: ____

Method of Shipment: ____

Tracking No.: ____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Container(s) Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1614 PBDE	CARB429 PAH	WHO-29
EB	8/9/12	-		2	A	W					X										

Special Instructions/Comments: ____

SEND DOCUMENTATION AND RESULTS TO:

Name: DAVID BESSINGPASS
Company: ARCADIS
Address:
City: ____ State: ____ Zip: ____
Phone: ____ Fax: ____
Email: DAVID.BESSINGPASS@ARCADIS-US.COM

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other____

*Bottle Preservative Type: T = Thiosulfate,
O = Other____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other____

 WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY